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GOLDEN JUBILEE EDITION • FIFTY YEARS OF RECLAMATION

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THE RECLAMATION PROGRAM

1953-59



UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION



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THE RECLAMATION PROGRAM • 1953–59

*GOLDEN JUBILEE EDITION
FIFTY YEARS OF RECLAMATION*

UNITED STATES DEPARTMENT OF THE INTERIOR

OSCAR L. CHAPMAN, *Secretary*

BUREAU OF RECLAMATION

MICHAEL W. STRAUS, *Commissioner*

THE 1953-59 PROGRAM *reflects an estimated long-range program for irrigation and hydroelectric power development in the 17 arid and semi-arid States west of the Mississippi. It is a revision of "The 1948-54 Program", printed at the request of the chairman of the Public Lands Committee, House of Representatives, for use by the Committee in considering emergent problems and future plans. The program is subject in all its aspects to congressional approval.*

The chairman of the Committee on Interior and Insular Affairs, House of Representatives, in his May 20, 1952, letter of request said: "... In the intervening 5 years many influences have been brought to bear on Reclamation's multiyear, multiple-purpose program as conceived for the immediate and potential development of the arid land and water resources in the West through construction of interrelated irrigation and hydroelectric power projects. The needs of the Western States for more irrigated acres and installed kilowatts continues to grow with the unceasing increase in their population. It seems fitting that as Reclamation celebrates its Golden Jubilee it should inform the Congress and the public of what lies ahead as it enters its second half-century."

In keeping with this observation, the 1953-59 program data presented are based on information and economic conditions on June 30, 1952. Future revisions will be necessary as additional information is obtained from investigations still going forward on potential but unauthorized projects, or as the result of changes in the general economic situation.

Water supplies in the West are limited and insufficient to satisfy all local or State needs. Since some of the States needing water for developing their natural resources have not yet agreed on how it should be divided among them, future State actions will affect the program. As in the former document, some estimates have been included that have required arbitrary decision in order to make a complete report; these estimates are unquestionably subject to adjustment.

PREFACE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
HOUSE OF REPRESENTATIVES
OFFICE OF THE CHAIRMAN
Washington, D. C., May 20, 1952

MICHAEL W. STRAUS,
*Commissioner, Bureau of Reclamation,
Department of the Interior,
Washington 25, D. C.*

MY DEAR MR. STRAUS: It is my desire to make available to the Interior and Insular Affairs Committee of the next Congress a factual, concise, and current reference on Federal Reclamation. This is being brought to your attention at this time in view of the time element involved.

I have in mind an up-to-date edition of the Bureau of Reclamation document, "The Reclamation Program 1948-54," which you prepared at the request of former Chairman Richard J. Welch. This report has served its intended purpose very well, but having been based on information as of June 30, 1947, no longer presents a current picture.

In the intervening 5 years many influences have been brought to bear on Reclamation's multi-year, multiple-purpose program as conceived for the immediate and potential development of the arid land and water resources in the West through construction of interrelated irrigation and hydroelectric power projects. The needs of the Western States for more irrigated acres and installed kilowatts continues to grow with the unceasing increase in their population. It seems fitting that as Reclamation celebrates its Golden Jubilee it should inform the Congress and the public of what lies ahead as it enters its second half-century.

Will you, therefore, please arrange for the publication of a new edition of "The Reclamation Program 1948-54" to cover a new 7-year period of 1953-59, accounting for Reclamation's contributions to the national economy from its inception in 1902 through 1952 and projecting its potentialities over the succeeding 7 years.

Submission of this program report to the Committee early in the next session, with its concurrent release for public use, should be more helpful to the Committee's deliberations on Reclamation matters.

Sincerely,

JOHN R. MURDOCK,
Chairman

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
Washington 25, D. C., December 5, 1952

*The Chairman,
Committee on Interior and Insular Affairs,
House of Representatives, Washington, D. C.*

MY DEAR SIR: In compliance with request of Chairman Murdock, by letter of May 20, 1952, we take pride in presenting this report on Federal Reclamation in the form of an up-to-date edition of "The Reclamation Program 1948-54," covering the period 1953-59 and retitled, "The Reclamation Program 1953-59."

Commemorating Reclamation's Golden Jubilee, the edition summarizes Reclamation's achievements in the past half-century and, equally im-

portant in keeping pace with the Nation's ever-growing economy, sets forth Reclamation's program for the next 7-year period of 1953-59.

We trust that this presentation will serve the Interior and Insular Affairs Committee of the Eighty-third Congress as a factual, concise and current reference on Federal Reclamation

and inform the Congress and the public of what lies ahead for Reclamation to accomplish as it enters its second half-century.

Sincerely yours,

MICHAEL W. STRAUS,
Commissioner.

LETTER OF TRANSMITTAL

DECEMBER 5, 1952.

MY DEAR MR. SECRETARY: I am pleased to submit the following report entitled "The Reclamation Program, 1953-59."

The report is to be issued as a printed document, in response to a request from the chairman of the Committee on Interior and Insular Affairs, House of Representatives. It is a consolidation and summarization of current data on our undeveloped land and water resources in the West and contains plans for a multiyear program, subject to congressional actions, for the development of these resources. Certain historical data on Reclamation development are presented.

Data in the report have been assembled from material developed in the field by Reclamation engineers, economists, and other specialists as of June 30, 1952, and cover a period of seven fiscal years extending from July 1, 1952, to June 30, 1959. Many of these data have been compressed into a series of charts and tables to aid in appraising the desirability of such a plan of development and to be of maximum assistance to the committee and other Members of Congress. These charts and tables show with current data how undeveloped water and land resources in the 17 arid and semiarid Western States can be converted by Reclamation construction into permanent national assets and help to strengthen the whole national economy. Brief, introductory information on the general aspects of Western water conservation and broad, over-all data affecting the proposed development is also included.

The plan embraces approximately 300 projects or units of projects, some of which would have irrigation facilities only, while others would be multipurpose projects or units providing other benefits or water use such as for hydroelectric power, flood control, and municipal water supply.

The projects and units considered for the program are listed and include both authorized

and potential but unauthorized projects. It is understood, of course, that the unauthorized potential projects must receive further investigation before final recommendation to Congress; therefore the inventory comprises more projects and units than proposed for construction to allow for defections upon full investigation.

The program has been placed on an annual basis with scheduling an orderly, progressive, year-by-year advance in the development of our land and water resources on a scale that will lead to its accomplishment by 1959.

Substantial appropriations would be required for the program, as follows:

| Fiscal year: | |
|--------------|---------------|
| 1953 | \$220,024,000 |
| 1954 | 257,637,000 |
| 1955 | 346,121,000 |
| 1956 | 412,694,000 |
| 1957 | 357,001,000 |
| 1958 | 285,556,000 |
| 1959 | 231,802,000 |

The report shows that the benefits would be substantial and permanent—huge increases in crop and livestock production and enlargement of critically needed electric power facilities, as well as flood control, municipal water supplies, and recreational benefits which result from Reclamation multipurpose construction.

Predicated on the 1953-59 plan to provide a full or supplemental water supply to an additional 3,111,700 acres of land, which could result in the establishment of 18,000 new farms and a stepped-up crop production on 37,000 farms now inadequately irrigated, the gross value of all crops grown by farmers supplied with irrigation water could be increased nearly \$284,000,000 annually, based on an agricultural price level of 215 (1910-14 equals 100).

Cumulatively, on the same price base, the 1953-59 gross revenues could reach an estimated \$5,400,000,000 from crops grown on all Reclamation projects including those already in operation,

as well as those brought into production during the program.

Substantial annual revenues would result from the hydroelectric power part of the 1953-59 multipurpose program. Installation of more than 2,800,000 kilowatts of additional generating capacity—increasing the present capacity to more than 7,300,000 kilowatts—would mean that an estimated \$516,000,000 cumulative gross revenue would be realized by 1959 from the program.

The over-all Reclamation program, as established by the Reclamation Act of 1902 and subsequent congressional actions, has for its goal the full development of water and land resources in western United States so that the West can come to its fullest economic stature and help provide for a constantly growing population. In principle, it is commonly agreed that the West should be developed as quickly as practicable, but interpretations of the practicable rate of development differ.

Although Reclamation pays its own way through reimbursements from water users and from power revenues and other benefits, the scope of its program at any given time is determined by Congress, which must officially authorize each project for construction and which appropriates the necessary funds for each fiscal year. Also, on occasion, Congress modifies Reclamation laws and practices and, thereby, the criteria

governing operations. Therefore, the 1953-59 program as presented is admittedly hypothetical and, in all its parts, it is subject to revision as more up-to-date information is received from the field.

Nevertheless, this program—based on present economic and international conditions—is considered by the Bureau of Reclamation as a realistic approach to essential, orderly, economic construction over a period of years. It can provide the groundwork for any and all long-range programing of Reclamation construction on a comprehensive base.

The West is still growing. It has great potentialities for wide development. If we are to attain the widest conservation and use of western land and water resources, Reclamation construction, evolving through the years from a project-limited scope to basin-wide activities for controlling western rivers, must be predicated in the future on inter-regional, Nation-wide considerations for the benefit of all.

Information contained in this report can, in the final analysis, provide Congress with the framework for whatever long-range course of action it may recommend for the full development of our vital natural land and water resources.

Sincerely yours,

MICHAEL W. STRAUS,
Commissioner.

CONTENTS

PREFACE

| | Page |
|---|------|
| Letter from the Chairman, Committee on Interior and Insular Affairs, United States House of Representatives, and Reply from Commissioner of Reclamation | iii |

TRANSMITTAL

| | |
|---|---|
| Letter of Transmittal from Commissioner of Reclamation to the Secretary of the Interior | v |
|---|---|

ANALYSIS OF DATA

| | |
|----------------------|---|
| Summary and Analysis | i |
|----------------------|---|

CHARTS WITH TEXT

| | |
|---------------------------------------|----|
| Distribution of Rainfall | 5 |
| Population and Food Supply | 6 |
| Population Trend . . . Westward | 7 |
| Land Use and Irrigation Possibilities | 8 |
| Growth of an Irrigation Project | 10 |
| Reclamation Results | 11 |
| Western Water Resources and Use | 12 |
| Reclamation Land Development | 14 |
| Reclamation Power Development | 15 |
| Estimated Land Development | 16 |
| Estimated Power Development | 17 |
| Estimated Crop Production | 18 |
| Estimated Power Revenue | 19 |

TABLES

| | |
|--|----|
| Statistical Résumé | 20 |
| Proposed 1953-59 Reclamation Construction Program | |
| Irrigated Land, Full and Supplemental Water Supply | |
| Estimated Annual Gross Crop Values | |
| Reclamation Projects | 21 |
| In Operation, Under Construction, or Authorized | |
| Under Investigation | |

SUMMARY AND ANALYSIS

What is known in the United States as "The West" comprises a land area of 1,162,000,000 acres in 17¹ of the 22 States west of the Mississippi River. The area extends from a tier of States on the 97th meridian to the Pacific Ocean, and from Mexico to Canada. It embraces more than three-fifths of the total 1,904,000,000 acres in continental United States.

The West has an infinitely varied terrain—plains, rolling hills, mountains, gorges, and desert. It has one predominant characteristic of climate: dryness. Throughout most of the area there is a scarcity of rain and snow. Generally, except for an isolated section in the northwest corner along the Pacific coast, there is not enough precipitation to grow crops and in many sections hardly enough for the maintenance of civilized life, because the scant water supply has not been stored and made available for use.

This is the area that Daniel Webster spoke of in 1852 when in opposing western railroad development, he said: "I will never vote 1 cent from the public treasury to place the Pacific Ocean 1 inch nearer to Boston than it is. What do we want with this vast worthless area—this region of savages and wild beasts, of shifting sands and whirlwinds of dust, of cactus and prairie dogs? To what use could we ever hope to put these great deserts and those endless mountain ranges?"

What Mr. Webster failed to realize a century ago was the great development potentialities of the West and its tremendous natural wealth in land, minerals, and forests. He failed to foresee that the United States would one day come to cherish this land as its main hope for a mushrooming population.

¹ Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

The wealth of minerals in the West is an example of its immense untapped resources. It has great reserves of industrial fuels such as coal, petroleum, and natural gas, and the promise of substantial metallurgical coke production, the largest known magnesite deposits in the world, the country's only commercially valuable manganese, almost all the high-grade phosphate reserves in the United States, a world monopoly of helium, and large deposits of gold, silver, copper, lead, zinc, and a multitude of other metallic and nonmetallic minerals. Especially important, in view of world interest in atomic energy, is its uranium, radium, and other radioactive deposits.

But the greatest treasure in the West is not minerals but water. Water is the prerequisite of all civilized development. Minerals, even though abundant, in themselves rarely build the towns and cities that offer myriad opportunities for livelihood, create business and industry, and add their vital force to the strength of the Nation. Towns and cities must have an agricultural hinterland in order to exist—a hinterland of farms that produce the essentials of life such as food, shelter, and clothing. These can issue only from a union of land and water.

The basic fact underlying all the Bureau of Reclamation data in this report is the scarcity of water and the need to conserve all possible. The data show that conservation and use of all the available life-giving water is the answer for the full economic development of the West—water to irrigate farms, to supply municipalities, water to generate electric energy for farms, homes, and industry.

Complete control of the great Western rivers and more efficient use of the total river water supply so that more streams can be diverted to areas in dire need of water is vitally necessary. The building of additional multipurpose dams

in sufficient numbers and at strategically located points is essential in order to harness erratic river waters not now so controlled, and to conserve and put to practical use millions of acre-feet² of stream runoff now lost by wasting itself to the sea and into the air.

Regional surveys show that the Reclamation States have about 392,000,000 acre-feet of stream runoff annually, but only about one-fifth of the runoff—78,200,000 acre-feet—has been developed and put to use. Under Reclamation repayment requirements for irrigable land, and with our present technical knowledge and facilities, about one-third of the runoff—128,620,000 acre-feet—is now considered susceptible of development. The balance is not in the right places, creating an unpleasant paradox of simultaneous surpluses and critical shortages in Western water supplies.

With the water supply what it is and until new means of conservation and distribution are found, only 3 out of every 100 acres of land in the West—42,243,000 out of a total of 1,162,000,000 acres—can be irrigated to produce crops. Already under irrigation are 25,041,000 acres, leaving only 17,202,200 acres possible of development. About 31 percent of the acreage now under irrigation, or 7,691,000 acres, still lacks a full season's supply of water to grow crops.

Studies from the seven Reclamation regions show that full western water-resource development is an American-sized problem. Some small beginnings have been made in overcoming the localized lack of balance in water supply, an especially troublesome aspect of the problem. Although State interests and other factors have brought complications, water has been moved from places of less to those of greater need.

Reclamation economists, engineers, and other specialists who made the studies, emphasize that the only real solution for full use of the scant water supply will lie in the eventual exportation and importation of water from State to State and region to region. In this way, fertile but arid lands, far removed from river areas, could be irrigated with water brought great distances from areas where surplus river water exists. It is pointed out, however, that the protection of

present water rights and uses in the exporting river basin and the assurance of future expansion of use within that basin, would be of fundamental importance.

The Bureau of Reclamation's 1953-59 program for the conservation and development of western water resources would irrigate 1,400,000 acres of arid land within 7 years, creating about 18,000 new farms. It also proposes to provide a sorely needed additional supply of water to 1,712,000 acres of land, consisting of nearly 37,000 farms now irrigated but short of water.

Acreage receiving a full supply of irrigation water from Reclamation works would be increased during the program from 2,834,000 to 4,234,000 acres, and the acreage supplied with supplemental water from 3,758,500 to 5,470,500 acres.

By years the new and supplemental acreage proposed for development during 1953-59 follows:

| Year | Acreage | |
|-------|-------------|--------------|
| | New | Supplemental |
| 1953 | 105, 300 | 142, 100 |
| 1954 | 148, 200 | 165, 100 |
| 1955 | 158, 400 | 268, 400 |
| 1956 | 159, 000 | 160, 700 |
| 1957 | 252, 800 | 79, 400 |
| 1958 | 193, 900 | 843, 200 |
| 1959 | 382, 100 | 53, 100 |
| Total | 1, 399, 700 | 1, 712, 000 |

By regions, the proposed acreage new and supplemental development would be:

| | | |
|----------|----------|----------|
| Region 1 | 499, 500 | 695, 800 |
| Region 2 | 277, 800 | 312, 800 |
| Region 3 | 86, 400 | 23, 500 |
| Region 4 | 35, 700 | 55, 200 |
| Region 5 | 32, 200 | 84, 900 |
| Region 6 | 244, 900 | 141, 100 |
| Region 7 | 223, 200 | 398, 700 |

The estimated gross value of crop production on Reclamation projects during the 7-year program would total \$5,434,000,000, based on an agricultural price level of 215 (1910-14 equals 100). The incremental increase over the 1951 value during the period would total \$950,000,000.

A sizable investment, totaling \$2,110,835,000 for the 7 years, would be required for the 1953-59 multipurpose Reclamation program. It would

² An acre-foot of water is the equivalent of 1 acre of land covered by 1 foot of water.

average over \$300,000,000 a year, ranging from \$220,000,000 the first year to as much as \$413,000,000 for 1956. The question might arise: Why so much money, and so quick a development?

Constantly increasing population requires proportionate increases in food supply. Actually, there are no considerable acres of raw land remaining in the United States to be brought under cultivation except by drainage or irrigation.

The only way the United States has been able to keep ahead in the race between increased population needs for food and fiber and declining land resources is by greater efficiency in production on existing acres and by the fact that irrigated agriculture produces more returns per acre than that possible from nonirrigated agriculture.

Crops produced on western irrigation projects are supplemental to, rather than competitive with, crops produced on agricultural lands in other sections. Principal products of western irrigated lands are the high nutrition foods—fruits, vegetables (winter truck crops of which we never have adequate amounts for a completely satisfactory national diet), livestock, and dairy products. Large amounts of alfalfa and sugar beets produced form the basis for a large livestock and livestock products industry. Most of the forage and grain crops, considered national surplus, are consumed locally in the West in greater quantities than they are produced.

The rate of western water-resource development for the period 1953–59 and the financial outlay that would be required for it are conservative estimates that take into consideration population trends and the total time that will be required for full development. Even this program is not considered adequate to meet the needs, particularly critical power shortages, by 1959.

The studies indicate that water is available for the ultimate irrigation of 15,802,200 more acres of new land, in addition to the 1,400,000 acres proposed under the 1953–59 program. This ultimate new-land figure does not include range land susceptible of irrigation for pasture, on which insufficient information is available.

Potential ultimate new acreage developments, by regions, including new acreage proposed for

development under the 1953–59 program, are as follows:

| | |
|----------|-------------|
| Region 1 | 3, 924, 000 |
| Region 2 | 3, 400, 000 |
| Region 3 | 380, 000 |
| Region 4 | 1, 480, 500 |
| Region 5 | 1, 924, 000 |
| Region 6 | 3, 625, 000 |
| Region 7 | 2, 468, 700 |

Aside from its water-conservation benefits for irrigation, municipal and industrial purposes, Reclamation multipurpose construction affords protection against the vicissitudes of flood, preserves fish and wildlife, spark-plugs vast recreational activities around its reservoir lakes, and provides sources of power by extracting electricity from the falling water at its damsites.

Since 1906, when the Reclamation Act was amended to permit hydroelectric power to be developed from irrigation works, power revenue has helped to repay Reclamation multipurpose construction costs. Actually, power now pays the major part of the reimbursable costs.

The 1953–59 program proposes the installation of 2,866,500 kilowatts of generating capacity in powerplants constructed or to be constructed on Reclamation projects, excluding Alaska. The new capacity installed during the 7 years would increase the present annual generation from 23 billion to over 52 billion kilowatt-hours.

The proposed year-by-year installation would be as follows:

| | <i>Kilowatts</i> |
|------|------------------|
| 1953 | 352, 500 |
| 1954 | 192, 500 |
| 1955 | 211, 500 |
| 1956 | 39, 000 |
| 1957 | 554, 400 |
| 1958 | 434, 900 |
| 1959 | 1, 081, 700 |

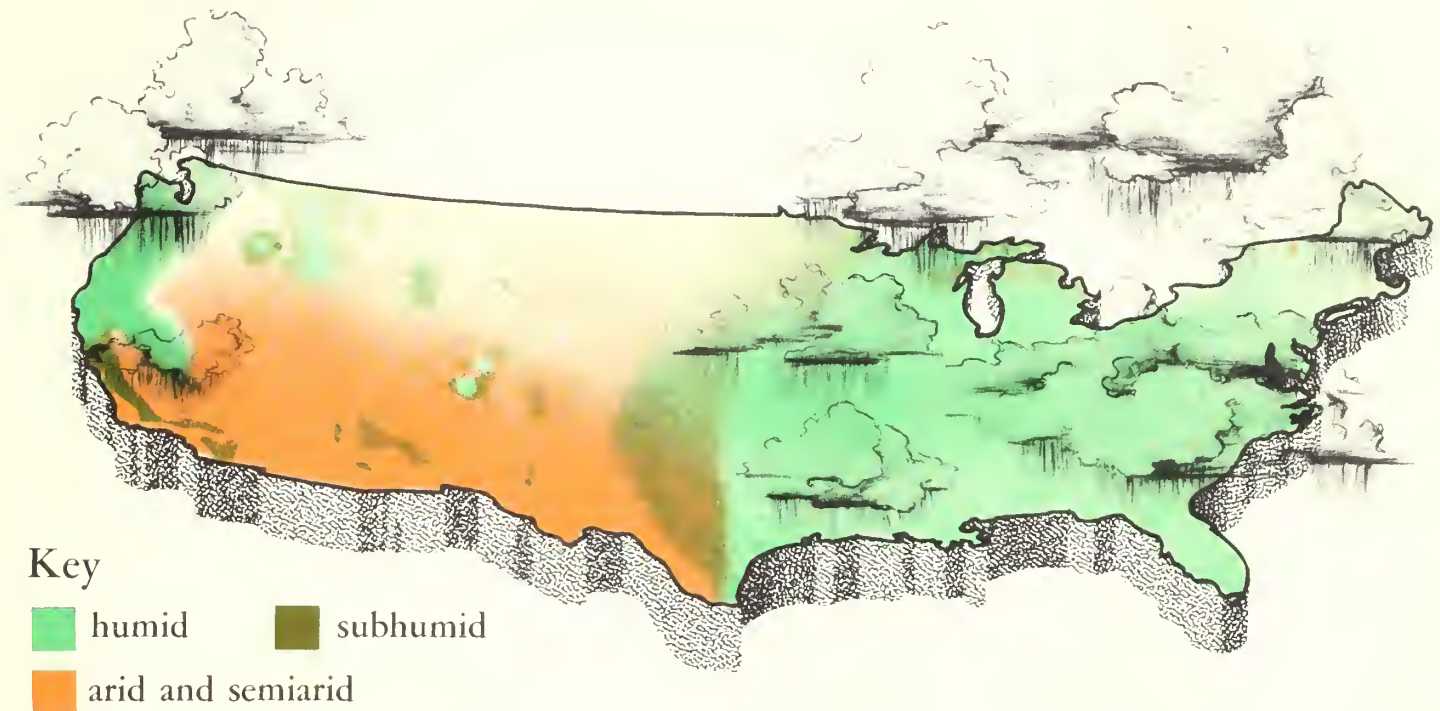
Hydroelectric power is an inexhaustible source of energy and one of the most vital resources in the western States. Above the power requirements for irrigation pumping and drainage, there is a surplus of electric energy which can be sold commercially in the immediate vicinity of Reclamation projects. This power is available for development of the vast mineral resources of the West and for municipal and industrial use. Also, low-cost electric energy to power farm machinery and provide present and future farm homes on Reclamation projects with ordinary conveniences of modern living. With their ever-continuing

water sources, hydroelectric plants, in addition, can be the means of conserving exhaustible natural resources of coal and oil by replacing fuel-burning electric plants.

Construction of powerplant facilities at Reclamation reservoirs must be accompanied by construction of adequate transmission lines in order to achieve optimum development and use of hydroelectric energy in the West. These lines are necessary to interconnect and coordinate output of the various isolated plants into a smoothly working system capable of utilizing every kilowatt-hour of electricity from each plant with no waste of useful energy and to move power to areas where needed by the people of the West. They must be constructed to pumping plant stations and to areas of agricultural, mineral, and industrial development for further distribution by others.

Revenues derived from the sale of electric energy from power systems thus developed repay the investment in power with interest in a specified number of years, provide annual funds for operation, maintenance, and replacements, and also repay a large portion of the irrigation investment. Thus, Reclamation's hydroelectric power development not only pays for itself and aids the farmer in repaying the Government's investment in irrigation facilities, but also makes feasible the whole program of multipurpose water development in the West. In the future, an estimated minimum of 80 percent of the revenues required to repay the reimbursable investment in large multipurpose water development projects must come from power revenues if such projects are to be feasible from a financial standpoint.

DISTRIBUTION OF RAINFALL



THIS SIMPLIFIED ILLUSTRATION shows the degree of need for supplemental water application in the United States. The area of greatest need covers approximately one-half of the Nation and includes almost all of the Great Plains, Mountain, and Pacific States. Large as this area is, it by no means covers the water-short areas of the Nation. Seasonal shortages have hampered development or have been conducive to "one-crop" economies throughout most of the country, and all too frequently distress or disaster areas have been reported from the humid and subhumid sections of the Nation because the rains did not come as needed.

Experience in the development of our own West has encouraged the popular view that irrigation is associated only with aridity. However, in recent years experience with supplemental irrigation in the eastern and southern States and in the Pacific West invites the conclusion that irrigation is susceptible to much wider application. In fact, wherever periods of drought of 10 days or greater occur during the growing season, highly beneficial results as measured in terms of adapted crop species and yields and quality of the product grown are realized through the application of supplemental irrigation water.

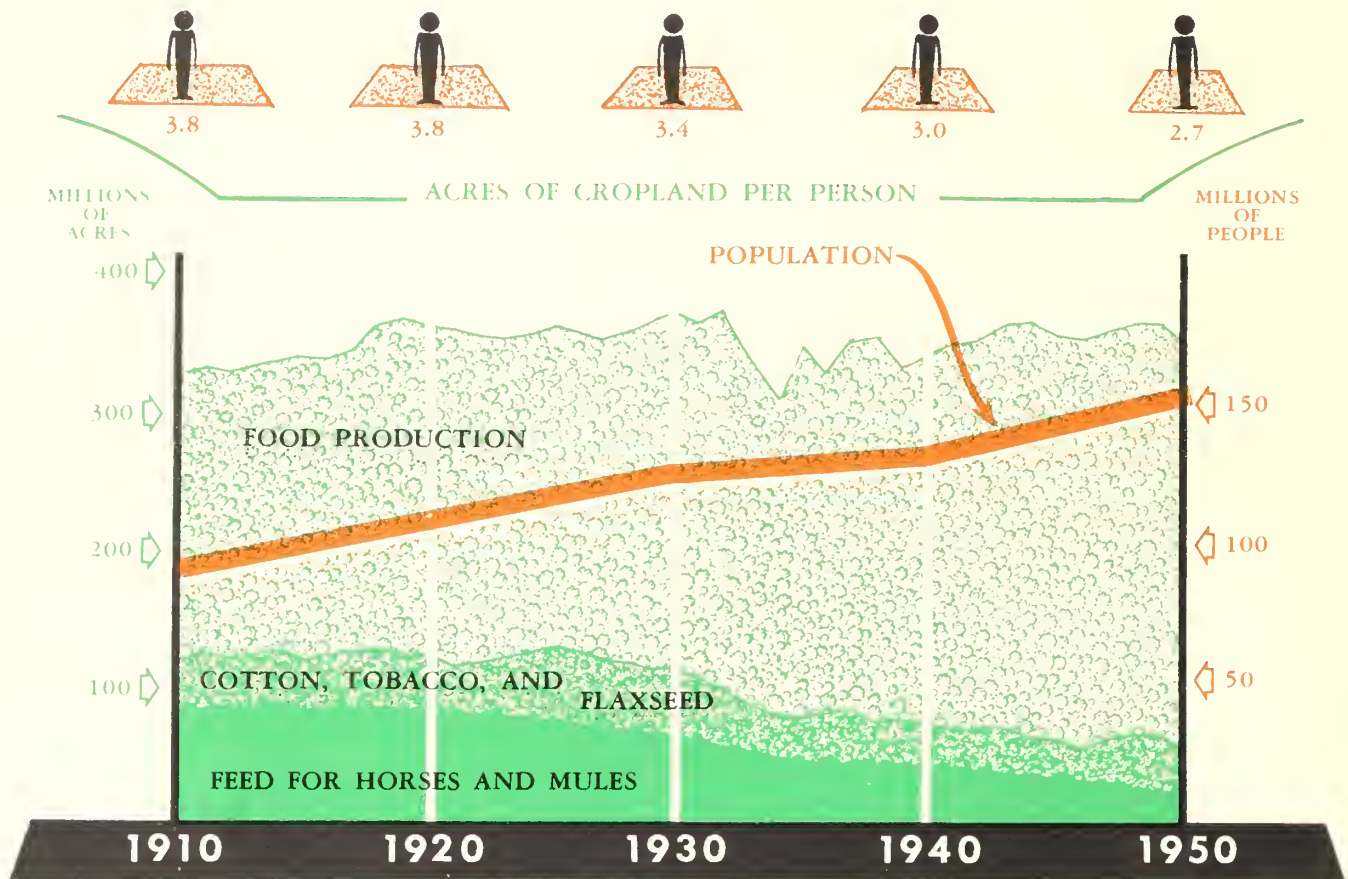
Careful analysis of Weather Bureau records reveals that from 7 to 10 periods of drought in magnitude sufficient adversely to affect crop quality and yields can be

anticipated in the average growing season throughout most of the so-called "humid sections" of the United States. These areas, which we have heretofore regarded as being adequately watered, can be made to produce a greater variety of high quality crops if the vagaries of natural precipitation are equalized through irrigation.

The greatest increment through irrigation naturally will continue to be recorded in the hot, dry sections of the Southwest. In fact, without additional water conservation, the contribution of the West to a strong and dynamic Nation will be restricted to its present level and without the stimulant of a growing West, the East, too, will not prosper and will tend to stagnate; both halves of the Nation are interdependent. One cannot suffer economic atrophy without weakening the other.

Water—the Nation's greatest replenishable natural resource—must be conserved and developed at an accelerating rate. Reclamation in the West and supplemental irrigation throughout the rest of the country must work as allies in the economic growth of the Nation. Both must be stepped up if the pressures of rapidly increasing population are to be met with positive action. Any other course means forfeiture of a part of our national tradition, stagnation of development, and decreasing standards of living.

POPULATION AND FOOD SUPPLY



SINCE 1920 THE LAND used for crops has remained at approximately 400 million acres. During the last half-century, the acreage of cropland available per capita has constantly decreased. In 1900 there were 4.2 acres for each person; by 1950, 2.7 acres. With fewer acres per person, we are living better than 25 or 50 years ago.

This miracle has been aided by farm mechanization, development of synthetic fibers, and the shift in the export and import balance. The equivalent of 50 to 60 million acres of new land has become available by the replacement of horses and mules with tractors. Proportionate equivalent additions resulted through discovery and production of synthetic fibers and the shift in trade balance. Mechanization is virtually complete. We have reached what appears to be the point of minimum cotton requirements, and production has increased in the interest of national well-being. We have become a balanced agricultural nation in terms of exports and imports. Additional relief cannot be anticipated from these sources.

Against this backdrop of agricultural adjustments, we face a future which will see 6,000 more persons each day surround the dinner table and our population surge upward to 190 million by 1975. Where four surround the

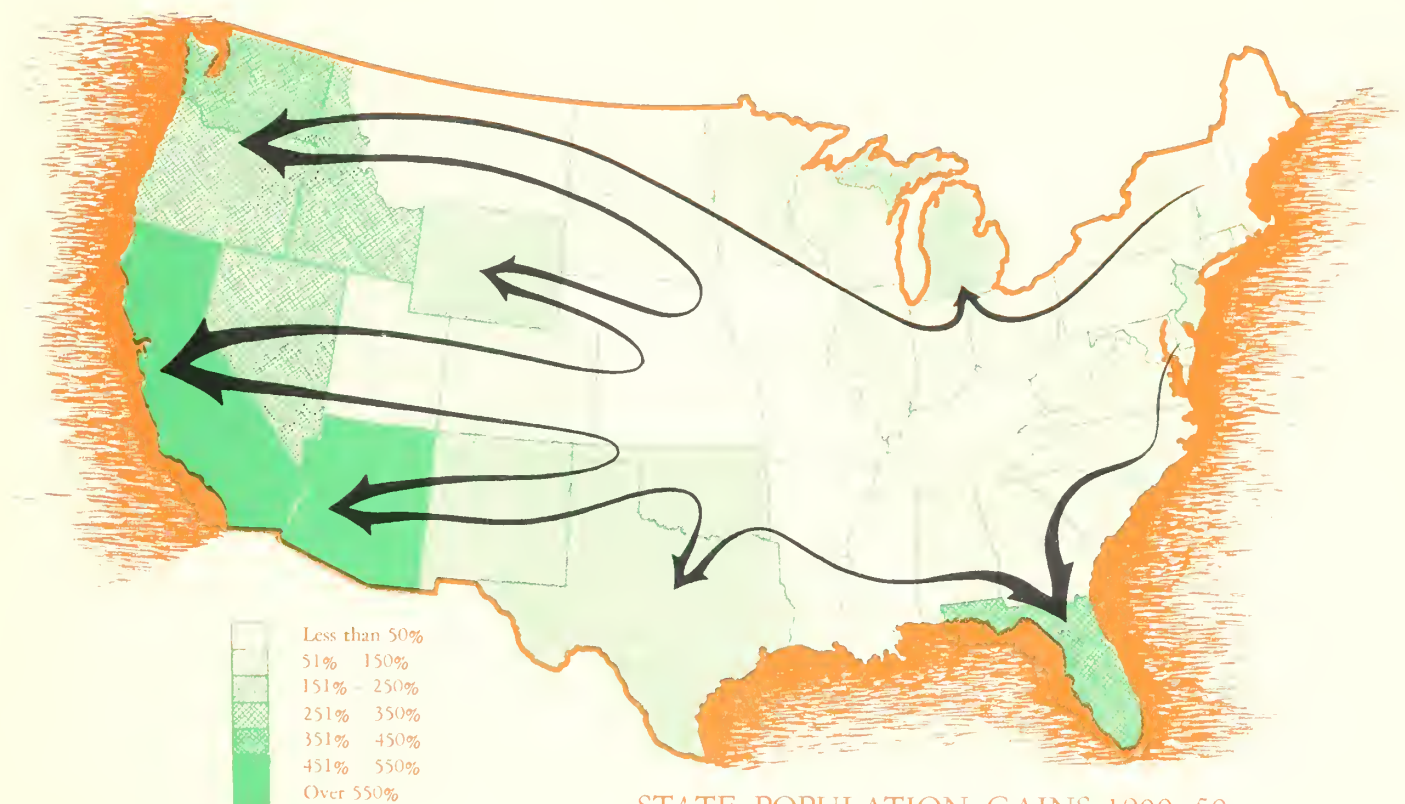
dinner table, a fifth will join by a quarter of a century. Present farm production will not provide for that fifth person if we are to live as well as we do, allow for desired improvements, and take care of national commitments.

This does not imply that Americans will go hungry in the next 15 or 25 years. Farm output has been stepped up. We have developed irrigation and applied it to over 26 million acres in the production of more and finer crops. Most of this land was reclaimed from desert. We have used better seed and planting stocks, more fertilizer, and many tools of soil conservation and better husbandry to make each acre produce more. The Nation will meet the challenge of increased population by continuing and accelerating these processes.

The equivalent of 100 million new acres must be developed. Much of this will come from more intensive use of land we now farm, a part will come through new irrigation projects in the arid West. But perhaps the most productive potential source will come through making irrigation available where rainfall is unreliable or inadequate.

The above figure traces shifts in the major uses of our cropland since 1910 and charts the downward trend in crop acres available per person.

POPULATION TREND—WESTWARD



SOURCE: 1950 Census of Population.
Bureau of Census, Department of Commerce

STATE POPULATION GAINS 1900-50
National Average, 98.3%

SINCE THE DAWN OF HISTORY the movement of people in search of a better life has been west. From Asia they pressed into and across Europe, sailed the wide Atlantic, spread through America and pressed on to the Pacific.

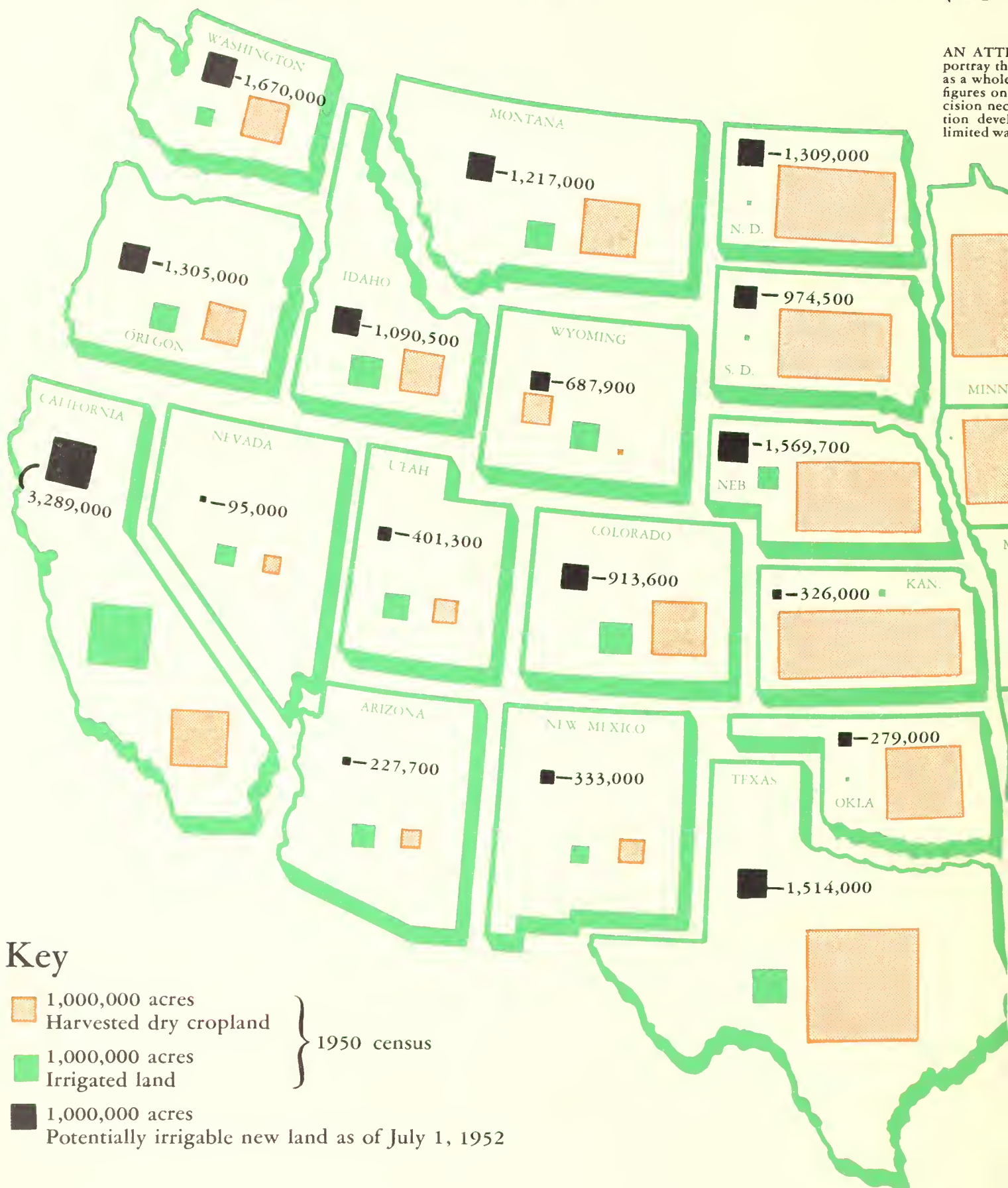
In the United States the phenomenal increase in western population clearly indicates the economic maturing of that vast area which a century ago was little more than the domain of cowboys, trappers, and Indians. The rate at which this process is being accomplished is recorded in the last census, which established the West as the most rapidly growing section of the Nation. Expressed in terms of the percentage increase of 1950 over 1900, the 17 western States gained 25.8 percent, the 11 Mountain and Pacific States 40.9 percent, and the 3 Pacific States 48.8 percent, while the United States population increased only 14.5 percent. In the 50 years between 1900 and 1950, the 17 western States gained 204 percent, the 11 Mountain and Pacific States 378 percent, and the 3 Pacific States 499 percent, while the United States population did not quite double. The West is growing up and, in the process, is assuming more than ever a position of vast strategic importance in the Nation's future.

In the years immediately ahead, between 2 and 2½ million more persons will be added to the Nation's population. Under normal conditions of economic opportunity this rate of growth will increase and continue until the full potential of the Nation has been attained. The West must provide opportunities for constantly increasing numbers of these people. In this process the orderly development of western water must provide increasing agricultural and industrial opportunities for the additional millions who will seek their future in an expanding and dynamic West.

New farming and industrial opportunities in the West in turn translate to new manufacturing and service opportunities for others in the nonwestern States. Western development thus becomes the key to the Nation's prosperity and Reclamation in turn provides the key to make the integrated and orderly development of the West possible.

A constantly expanding agriculture and industry will support the steadily rising standards of living which fulfill American ambitions, satisfy American desires, and keep America strong.

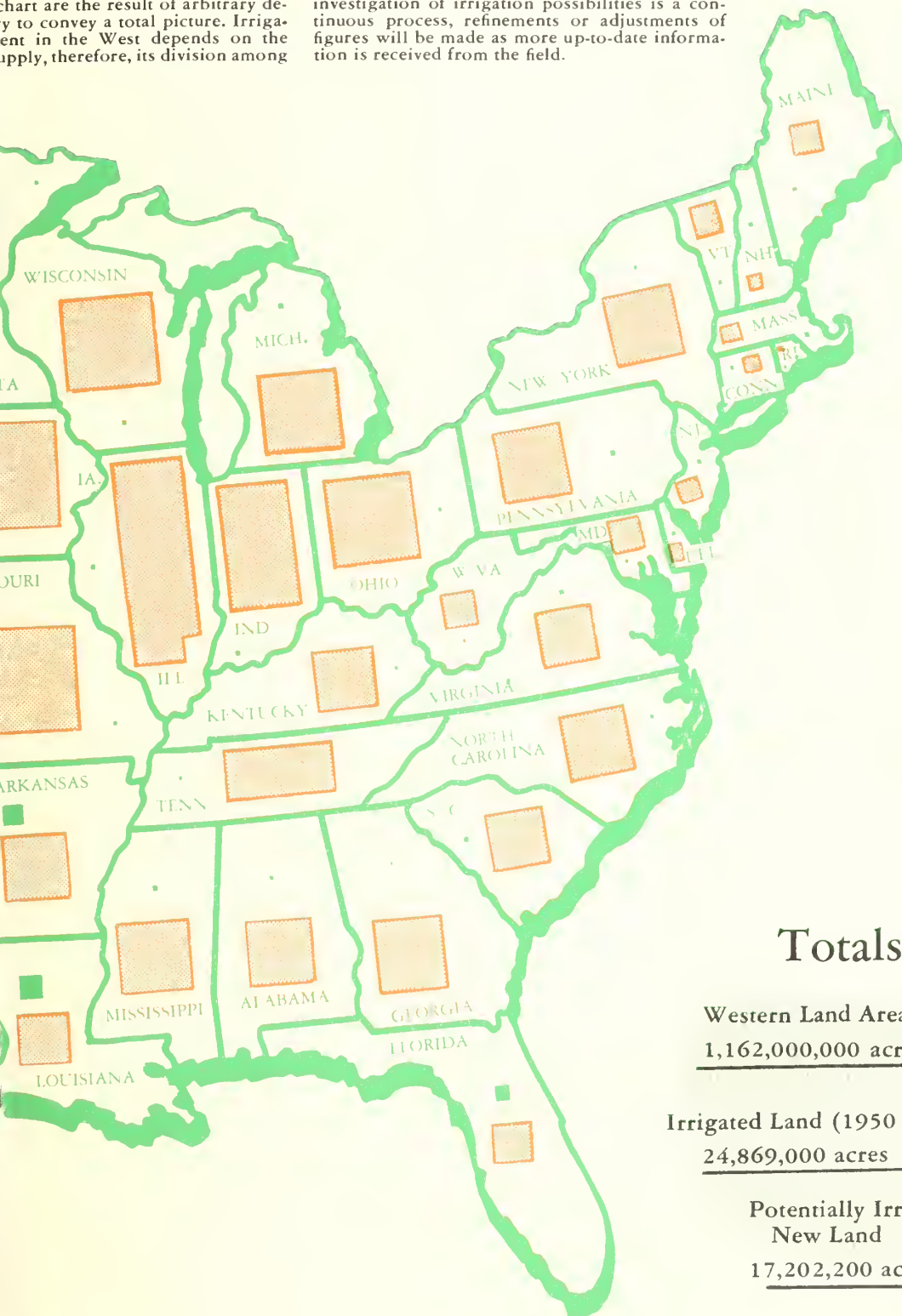
LAND USE AND



IRRIGATION POSSIBILITIES

It has been made in this chart to show the land-farm situation in the West as related to the East. Some of the data are the result of arbitrary decisions to convey a total picture. Irrigation in the West depends on the supply, therefore, its division among

the States will eventually determine the irrigable acreages in the States. Also, estimates are based on information as of June 30, 1952, and since the investigation of irrigation possibilities is a continuous process, refinements or adjustments of figures will be made as more up-to-date information is received from the field.



IRRIGATED FARM LAND IN THE UNITED STATES

| State | 1950 census of irrigated land (acres) |
|------------------------------|---------------------------------------|
| Total—48 States..... | 26,398,189 |
| Total—17 Western States..... | 24,868,899 |
| Arizona..... | 979,014 |
| California..... | 6,618,595 |
| Colorado..... | 2,940,502 |
| Idaho..... | 2,168,323 |
| Kansas..... | 140,992 |
| Montana..... | 1,809,908 |
| Nebraska..... | 887,505 |
| Nevada..... | 722,896 |
| New Mexico..... | 691,429 |
| North Dakota..... | 35,759 |
| Oklahoma..... | 44,189 |
| Oregon..... | 1,338,226 |
| South Dakota..... | 84,356 |
| Texas..... | 3,148,115 |
| Utah..... | 1,166,659 |
| Washington..... | 617,362 |
| Wyoming..... | 1,475,069 |
| Total—31 other States..... | 1,529,290 |
| Alabama..... | 367 |
| Arkansas..... | 418,644 |
| Connecticut..... | 8,088 |
| Delaware..... | 404 |
| Florida..... | 362,909 |
| Georgia..... | 21 |
| Illinois..... | 1,510 |
| Indiana..... | 5,384 |
| Iowa..... | 1,386 |
| Kentucky..... | 485 |
| Louisiana..... | 598,056 |
| Maine..... | 2,398 |
| Maryland..... | 697 |
| Massachusetts..... | 18,507 |
| Michigan..... | 13,901 |
| Minnesota..... | 4,235 |
| Mississippi..... | 5,086 |
| Missouri..... | 2,089 |
| New Hampshire..... | 622 |
| New Jersey..... | 28,117 |
| New York..... | 19,248 |
| North Carolina..... | 2,083 |
| Ohio..... | 5,810 |
| Pennsylvania..... | 7,251 |
| Rhode Island..... | 1,631 |
| South Carolina..... | 6,408 |
| Tennessee..... | 1,012 |
| Vermont..... | 303 |
| Virginia..... | 2,817 |
| West Virginia..... | 40 |
| Wisconsin..... | 9,781 |

Source: Preliminary 1950 Census: Series IR50-1, and Series AC50-1.

Totals

Western Land Area
1,162,000,000 acres

Irrigated Land (1950 census) 742,000,000 acres
24,869,000 acres

Potentially Irrigable New Land 1,529,000 acres
17,202,200 acres

GROWTH OF AN IRRIGATION PROJECT *

Current Annual Tax Revenue:

\$69,400,000

Retail Sales 1951, Maricopa County:

\$468,637,000

*Salt River Valley,
Maricopa County,
Arizona

1951

1910

| | | |
|-------------|---|---------------|
| 15,000 | irrigated acreage | 297,000 |
| 24,000 | project farm and town population, Maricopa County | 350,000 |
| 21,250 | carloads of farm products produced | ** 82,000 |
| 5,000 | carloads shipped from project | ** 41,000 |
| \$6,254,000 | farm returns | \$105,479,000 |
| 1 | hydroelectric plants | 8 |
| \$46,000 | operating power revenues (gross) | \$8,109,000 |
| \$5,228,000 | bank deposits | \$255,720,000 |

** Estimated.

HORATIO ALGER'S THEME on a magnificent scale, not the rise of an individual, but of a community of over one-third of a million people—is found in the story of the irrigation development of the Salt River Valley in southcentral Arizona.

At the turn of the century, Phoenix was a village in the desert. Today it is a metropolis and the heart of the Salt River project, one of the most highly developed agricultural areas in the United States.

The gross value of crops produced on the project during 1951 reached an all-time high of \$89,509,000. Since the first irrigation water was supplied in 1910, the cumulative value of crops harvested through 1951 amounted to \$1,020,577,000. This wealth production is evidenced perhaps the most readily through its influence on retail sales, bank clearings, and Federal taxes. Retail sales from Maricopa County totaled \$468,637,000, volume of bank clearings in Phoenix reached \$3,229,375,000, and Federal taxes from Maricopa County were estimated at \$69,400,000, all during 1951.

Water is the secret of this story. Arizona's sun is warm and its soil is fertile—but the earth is dry as bone. Rain-fall averages less than 10 inches a year. Even before the white man came, Indians knew that crops wouldn't grow without irrigation, and that when the water supply failed

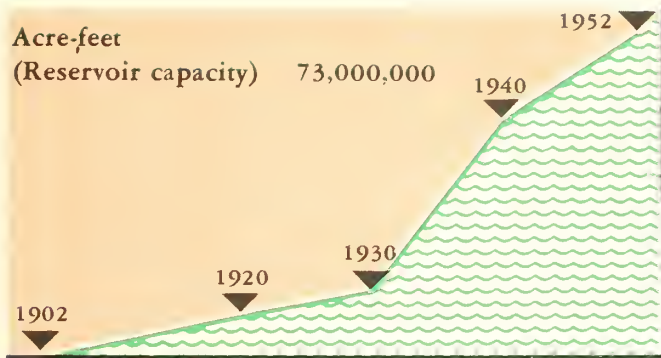
their plants would wither. Irrigation in the Salt River Valley was begun by white settlers about 1867 and also depended on direct diversion of an unregulated river—much too variable for satisfactory irrigation development.

In 1910, on the Salt River Reclamation project, the first storage facilities were completed for irrigation operations, together with a small hydroelectric power-plant. The growth of the area was phenomenal.

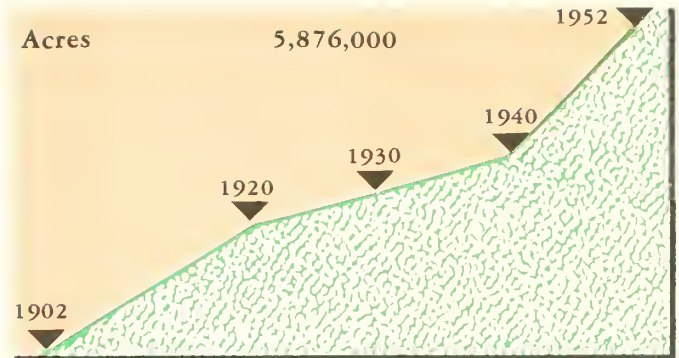
The adjusted contract between the Government and the Salt River Water Users' Association for works constructed by the Bureau of Reclamation was for \$10,938,000. Of this, \$9,812,000 has matured and been liquidated, leaving a balance on the original contract of \$1,126,000. Additions to the project were constructed by the Bureau and covered by contract entered into in 1935. This amount was for \$6,545,000 and \$1,243,000 has matured and been liquidated, leaving \$5,302,000. Currently a rehabilitation and betterment program is under way, the authorized maximum cost of which will be \$6,000,000. Through June 30, 1952, slightly over \$4,000,000 of this work had been accomplished and the Salt River water users had started to pay the cost back to the Government. At the end of the last fiscal year all amounts due and payable had been fully liquidated.

RECLAMATION RESULTS

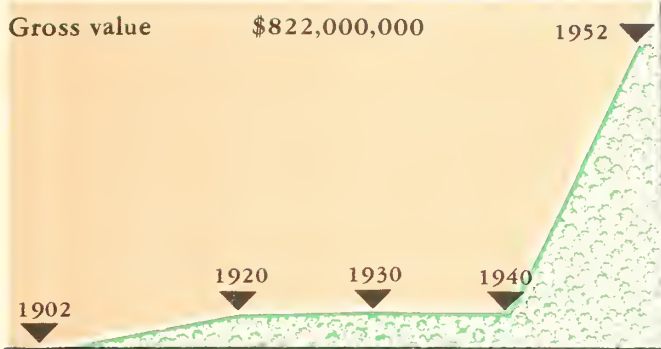
WATER CONSERVED



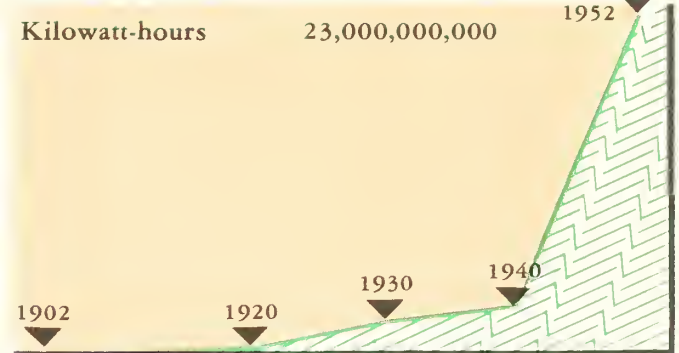
LAND IRRIGATED



CROPS GROWN



HYDRO POWER GENERATED



MORE THAN 5,000,000 Americans benefit directly from Reclamation activities, and tens of millions of others benefit indirectly. In addition to those persons served by water for either irrigation or municipal and industrial use or electric power generated by the water stored or diverted by Reclamation dams, every field of shipping, packing, processing, manufacturing, and supplying, as well as service organizations, is stimulated by the wealth created through Reclamation.

In 1950, average retail sales in the 17 Western States approximated \$1,100 in contrast to the national average of \$962. This new business includes automobiles from Michigan, electrical appliances from the Great Lakes States, textiles from New England, tobacco products from the South, and the thousands of other offerings of a great industrial Nation.

The irrigated West produces a high percentage of the fruits, nuts, vegetables, and truck crops grown in the Nation, and millions in the East as well as the West enjoy these commodities in attaining higher nutritional standards. These foods reach the markets over the trade ways of the Nation to extend benefits to another major segment of the Nation's people.

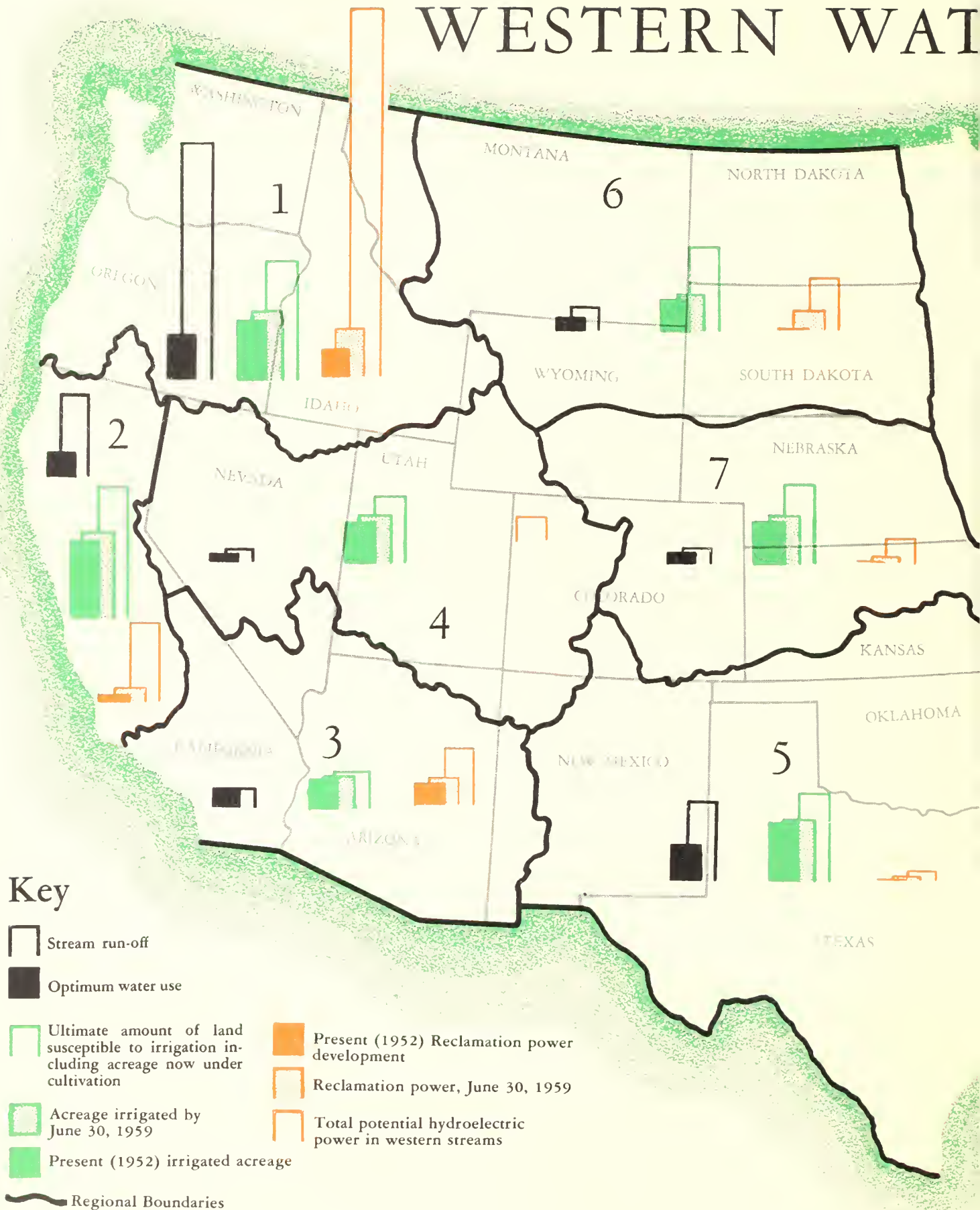
The direct benefits of Reclamation are measured also in terms of flood protection afforded by Reclamation dams, enhanced navigation of waterways afforded by Reclamation water-control structures, and in hunting,

fishing, picnicking, and the recreational facilities created or preserved through Reclamation and enjoyed by millions. Reclamation serves also in controlling salinity and sediment to round out its multiple-purpose usefulness to the 34 million people who reside in the 17 Western States served by Reclamation.

Benefits are measurable, too, in terms of increased "earning" potential. Conservative estimates place Federal revenues from Reclamation project areas at over 2.5 billion dollars, greater than the Federal investment in all Reclamation projects including those in construction.

The above graphs reflect only four of the direct, tangible results from 50 years of Reclamation construction. The "Water Conserved" graph shows the storage capacity of Reclamation reservoirs. The "Land Irrigated" includes 3,444,000 acres receiving varying amounts of supplemental water to round out and firm up inadequate supplies and 2,431,000 acres receiving a full water supply. The gross crop value figure includes only the value of crops produced and, in the interest of objectivity, value added by feed crops to livestock has been eliminated. In aggregate, the value of crops produced on Reclamation projects now stands at \$7,984,000,000, equal to seven times the Federal investment in all irrigation project features and approximately four times the investment in all features.

WESTERN WATER



ER RESOURCES AND USE

BY BUREAU OF RECLAMATION ADMINISTRATIVE REGIONS

BASIC STATISTICS OF WESTERN LAND AND WATER RESOURCES AND USE

Based on Availability of Water, and Not Under Conditions of Unlimited Supply

| | REGION 1 | REGION 2 | REGION 3 | REGION 4 | REGION 5 | REGION 6 | REGION 7 | TOTAL, 7 REGIONS |
|--|-------------|------------|-------------------------|-------------------------|-------------|-------------------------|-------------------------|---------------------------|
| ACRES | | | | | | | | |
| Land area..... | 178,000,000 | 65,000,000 | 125,000,000 | 162,000,000 | 300,000,000 | 200,000,000 | 132,000,000 | 1,162,000,000 |
| Forest area..... | 90,000,000 | 14,000,000 | 15,200,000 | 21,400,000 | 19,000,000 | 20,000,000 | 7,640,000 | 187,240,000 |
| Grazing area..... | 32,400,000 | 31,500,000 | 70,700,000 | 142,000,000 | 220,880,000 | 131,000,000 | 60,480,000 | 688,960,000 |
| Area that can be dry-farmed..... | 16,000,000 | 13,000,000 | 420,000 | 880,000 | 54,000,000 | 53,000,000 | 52,502,000 | 189,800,000 |
| Area susceptible of irrigation ¹ | 8,303,000 | 9,000,000 | 2,640,000 | 4,670,500 | 6,124,000 | 5,951,000 | 5,554,700 | ² 42,243,200 |
| ACRE-FEET | | | | | | | | |
| Water available (average annual runoff)..... | 205,000,000 | 68,500,000 | ³ 10,800,000 | ⁴ 11,100,000 | 64,000,000 | ⁵ 20,000,000 | ⁶ 12,400,000 | 391,800,000 |
| Present use of water ⁷ | 27,000,000 | 11,800,000 | 9,700,000 | ⁸ 4,800,000 | 16,500,000 | 4,500,000 | 3,900,000 | 78,200,000 |
| Needs under optimum development ⁹ | 37,200,000 | 21,400,000 | 10,800,000 | 9,350,000 | 30,100,000 | 12,300,000 | 7,470,000 | 128,620,000 |
| Needs for irrigation alone, optimum development ⁹ | 36,000,000 | 20,000,000 | 9,000,000 | 9,200,000 | 24,000,000 | 11,900,000 | 7,370,000 | 117,470,000 |
| Needs for domestic, industrial and other use, optimum ⁹ ¹⁰ | 1,200,000 | 1,400,000 | 1,800,000 | ¹¹ 150,000 | 6,100,000 | 400,000 | 100,000 | 11,150,000 |
| Unusable or unused water under optimum development plans..... | 167,800,000 | 47,100,000 | (12) | ⁴ 1,750,000 | 33,900,000 | 7,700,000 | 4,930,000 | ¹³ 263,180,000 |
| IRRIGABLE ACRES ¹⁴ | | | | | | | | |
| Present developed area ¹⁵ | 4,379,000 | 5,600,000 | 2,260,000 | 3,190,000 | 4,200,000 | 2,326,000 | 3,086,000 | 25,041,000 |
| Area susceptible of future development with full water supply (new land)..... | 3,924,000 | 3,400,000 | 380,000 | 1,480,500 | 1,924,000 | 3,625,000 | 2,468,700 | ² 17,202,200 |
| Area in need of supplemental water..... | 1,569,000 | 2,400,000 | 760,000 | 190,000 | 581,000 | 449,000 | 1,742,000 | 7,691,000 |
| Area programmed for 1953-59..... | 1,195,300 | 590,600 | 109,900 | 90,900 | 117,100 | 386,000 | 621,900 | 3,111,700 |
| Full water supply..... | 499,500 | 277,800 | 86,400 | 35,700 | 32,200 | 244,900 | 223,200 | 1,399,700 |
| Supplemental water..... | 695,800 | 312,800 | 23,500 | 55,200 | 84,900 | 141,100 | 398,700 | 1,712,000 |
| KILOWATTS OF POWER | | | | | | | | |
| Capacity installed on Reclamation projects June 30, 1952..... | 2,027,987 | 454,500 | 1,609,250 | 6,190 | 24,300 | ¹⁶ 98,400 | 149,300 | ¹⁶ 4,369,927 |
| Additional capacity programmed for installation 1953-59..... | 1,516,500 | 525,500 | 187,800 | 17,800 | 25,000 | ¹⁶ 1,306,600 | 210,900 | ¹⁶ 3,790,100 |
| Estimated potential hydro capacity..... | 25,244,000 | 5,500,000 | 3,900,000 | 3,000,000 | 464,000 | 3,752,000 | 1,756,000 | 43,616,000 |

¹ Based on available water.

² Excluding range land susceptible of irrigation; insufficient data available.

³ Does not include reuse of return flow or salvage.

⁴ Including water for exportation to Region 7, but not water to go to Region 3 under Colorado River Compact.

⁵ Not including possible 500,000 acre-feet importation.

⁶ Exclusive of presently negotiated and future imports from Region

⁷ Including requirements for Reclamation projects under construction or authorized for construction; data as of June 30, 1952.

⁸ Not including water exported and used by other regions.

⁹ Including present use plus reservoir losses (by evaporation, etc.) chargeable to the use.

¹⁰ Excluding power generation, navigation and other nonconsumptive uses.

¹¹ Excluding exportations for domestic and industrial use (e. g. Denver, Colo.)

¹² Probably small amount unconsumed but used to carry off salts and other wastes; excluding 1,500,000 acre-feet Mexican Treaty water.

¹³ Not a true total of regions because of export water, etc.


¹⁴ "Irrigable" in the sense of water availability for irrigation regardless of whether land is irrigated.

¹⁵ As of June 30, 1952.

¹⁶ Including United States Army plants in Missouri River Basin whose power is sold by the Bureau of Reclamation.

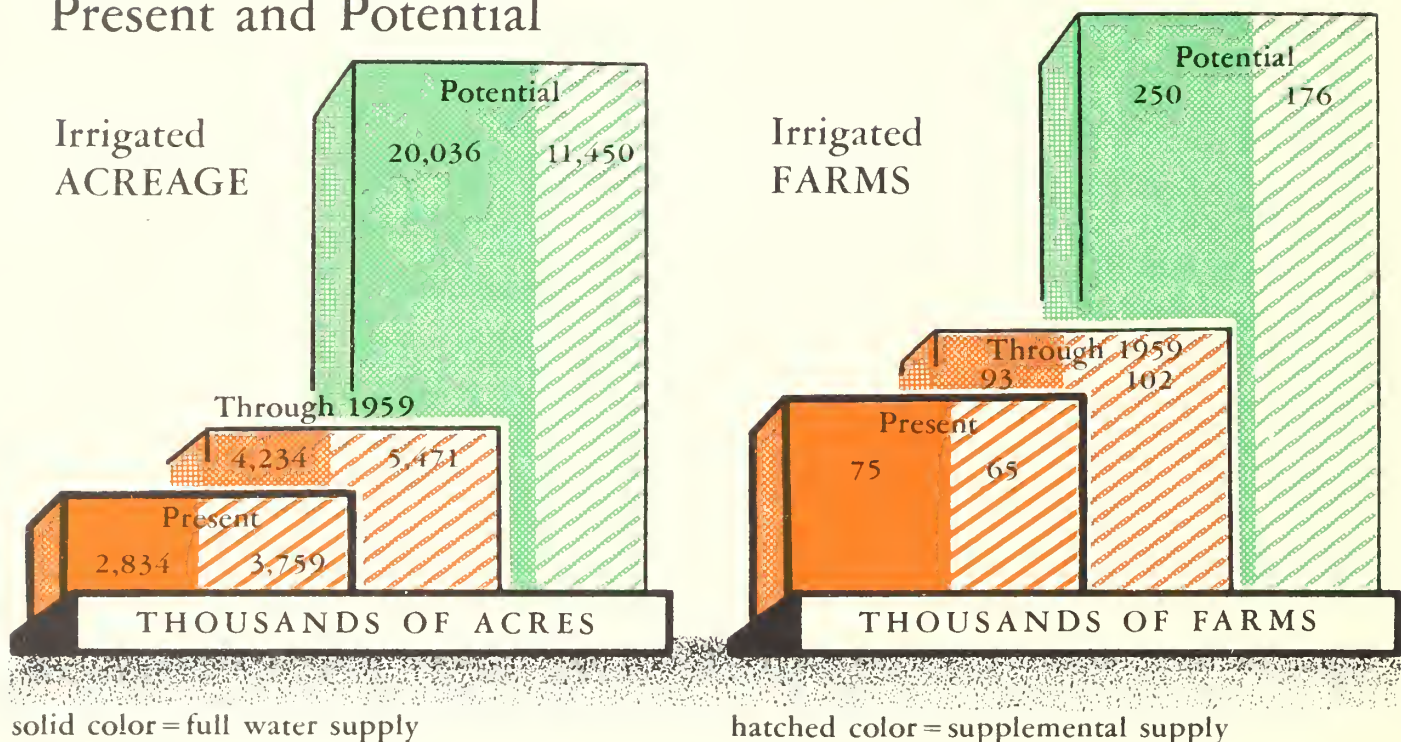
NOTE: Ultimate water supply figures are subject to change, and a greater or smaller amount of water may be diverted than indicated.

Scale

 **WATER**—50,000,000 acre-feet
LAND—5,000,000 acres
POWER—5,000,000 kilowatts

RECLAMATION LAND DEVELOPMENT

Present and Potential



THE LAND RECEIVING either a full or supplemental supply of irrigation water from Reclamation works in 1952 totaled about 6,593,000 acres.

Proposed construction under the 1953-59 program would increase by almost 50 percent the area supplied with water from Reclamation works by the end of fiscal year 1959.

The program would increase the area furnished a full water supply from 2,834,000 acres to 4,234,000 acres. This would mean that 1,400,000 acres of dry land—a great deal of it far too dry to be considered anything other than an arid waste—would be converted to flourishing, wealth-producing farms, adding their produce and their income to the combined production and income of the Nation.

It is estimated that the development of these 1,400,000 acres would create about 18,000 new family-size irrigation farms, with a population of around 55,000 to 75,000.

The program would also increase the area furnished with a supplemental supply of water (thus making

enough water available for irrigating the crops the entire season) from 3,759,000 to 5,471,000 acres. The number of farms provided with this supplemental supply of water would be increased from 65,000 to 102,000.

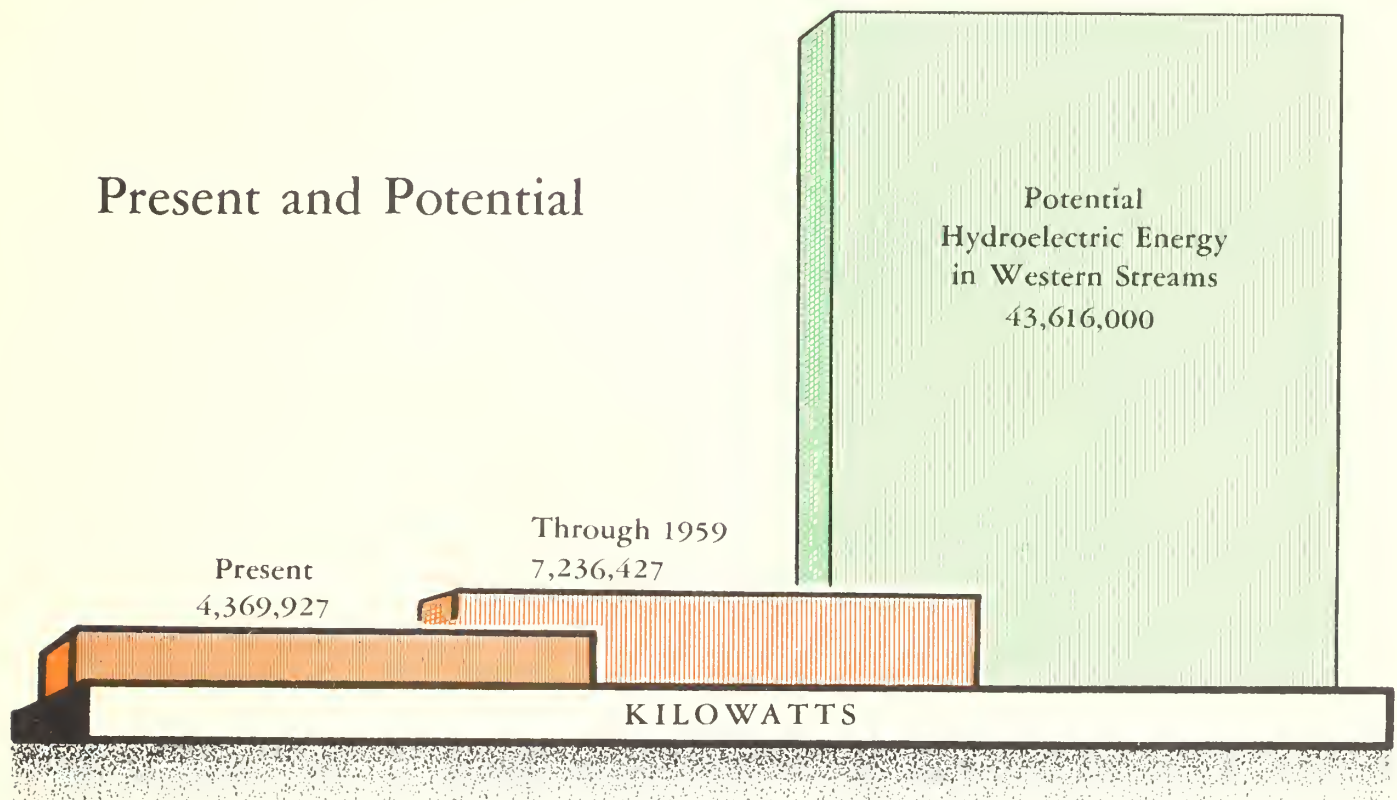
Without this supplemental water many of these farms would eventually cease operations and return to the desert, or at best revert to dry-land farming on a poverty scale, with public relief and the poorhouse the ultimate destination of their present occupants if they continued to try to wrest a livelihood from the land.

The potentially irrigable, undeveloped new land in the 17 Western States on June 30, 1952, was 17,202,200 acres. Proposing the irrigation of 1,400,000 acres, the program would leave 15,802,200 acres still undeveloped—work for future years.

When the land still undeveloped on July 1, 1959, is provided with irrigation water the number of farms receiving a full season's supply from Reclamation works will increase to nearly a quarter of a million.

RECLAMATION POWER DEVELOPMENT

Present and Potential



ELECTRIC GENERATING CAPACITY installed in 42 powerplants on Reclamation projects on June 30, 1952, totaled 4,369,927 kilowatts. Under the 1953-59 program the installation of additional generators in powerplants now operating and the construction of new powerplants would increase this capacity to 7,236,427 kilowatts.

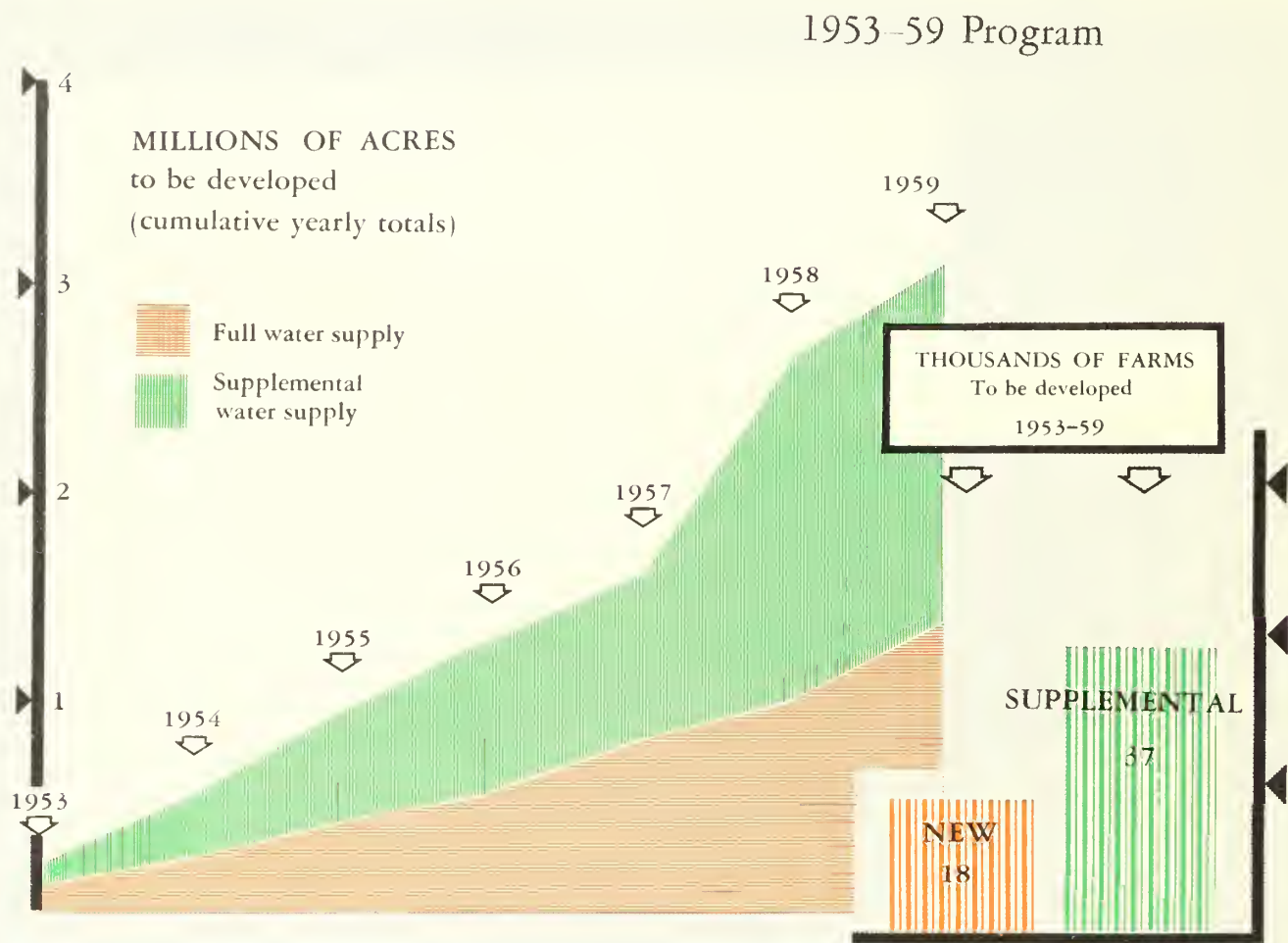
Still remaining undeveloped in western streams after June 30, 1959, provided that no other hydro developments are made by private companies or States or other agencies while Reclamation construction is going forward during the 7 years of the program, would be about 35,500,000 kilowatts of hydroelectric energy. Some of the streams containing this great, unused power potential have been developed to the extent that they are irrigating crops, supplying water to towns and cities, forming waterways for commerce and travel, offering boating, fishing, and bathing pleasures to the public, and giving light and power to homes, offices, and factories. But in many instances the rich resource of

electric energy they contain is wasting itself into the air and sea without benefit to the country.

Falling water is one source of generating electricity without depleting some exhaustible resource such as coal, oil, or gas. Water used for the generation of power can be used over and over again; nothing is ever taken out of it. Development of this natural resource of hydroelectricity to the fullest extent possible would not at all lessen the total of the other combined uses. Natural resources, generally, are exhaustible through use; hydroelectricity is not, it is a cake that can be eaten and still be had.

The orderly, progressive exploitation of this latent resource in future years through Reclamation's multipurpose water program could mean the emergence of whole new cities and communities as important agricultural, industrial, and business centers, a higher standard of living, and the comforts of modern life for millions of Americans in our growing population.

ESTIMATED LAND DEVELOPMENT



THE PRIMARY CONSIDERATION in projecting a multiyear Reclamation construction program is the determination of the year in which the new acreage, power, and other benefits of Reclamation are needed in the area. This is an economic determination, from which the engineer then estimates the time required for necessary field surveys and design of the physical works that will produce those benefits, and for their efficient and economical construction.

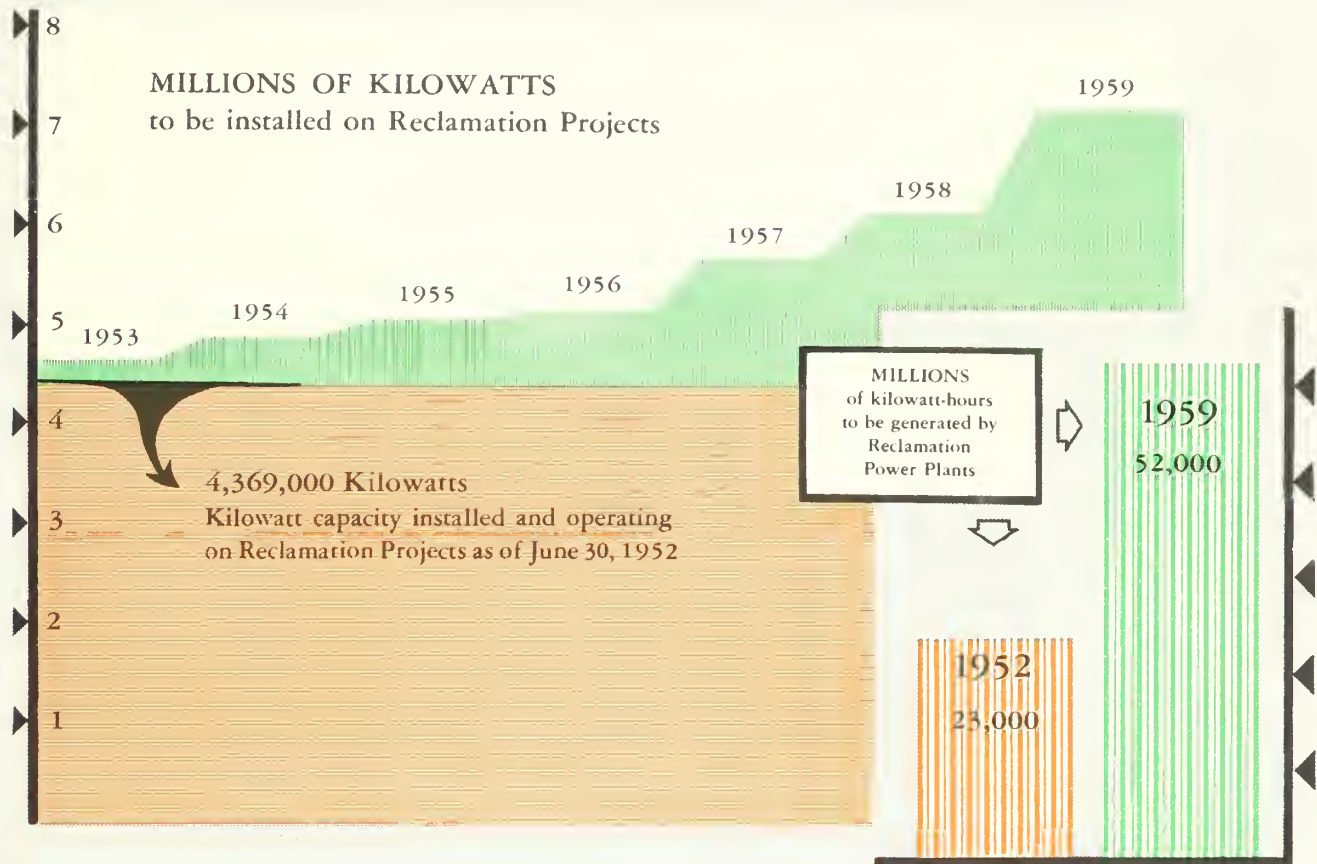
The need for the development of western water resources into land, power, and other Reclamation benefits is a present, and pressing, one.

The program proposes the introduction of 1,400,000 acres of new irrigable acreage during the seven fiscal years 1953 through 1959. Also, the program would provide a supplemental water supply to 1,712,000 acres now irrigated but lacking a full season's supply of water to grow crops.

In making irrigation water available to 1,400,000 acres of dry land, about 18,000 new farms would be created—with 18,000 new farm homes and 18,000 permanent, stable livelihoods. These in turn would create an immediate need for services, materials, and equipment that, judging from past experience, would sooner or later establish entire new communities on or near the irrigation areas with a population two to three times the new farm population. The urban population in turn would require all kinds of goods and create more business, not only in agricultural and manufactured products but also for services such as utilities. Simultaneously shops and stores and processing plants would be established in the new towns and cities to supply not only the new rural and urban population, but also that of outside areas in the country, and to buy from those outside areas in turn; and so the small, initial economic creation forms a substantial, constructive, vitalizing force in the national economy.

ESTIMATED POWER DEVELOPMENT

1953-1959 Program



THE 1953-59 PROGRAM proposes the installation of 2,866,500 kilowatts of generating capacity in powerplants constructed or to be constructed on Reclamation projects. This would increase the present installed capacity of plants from 4,369,927 to 7,236,427 kilowatts.

The proposed year-by-year installation would be as follows:¹

| | <i>Kilowatts</i> |
|-----------|------------------|
| 1953..... | 352,500 |
| 1954..... | 192,500 |
| 1955..... | 211,500 |
| 1956..... | 39,000 |
| 1957..... | 554,400 |
| 1958..... | 434,900 |
| 1959..... | 1,081,700 |

Cumulatively the installed generating capacity would be increased as follows:¹

| | <i>Kilowatts</i> |
|-----------|------------------|
| 1953..... | 4,722,427 |
| 1954..... | 4,914,927 |

¹ Alaska not included.

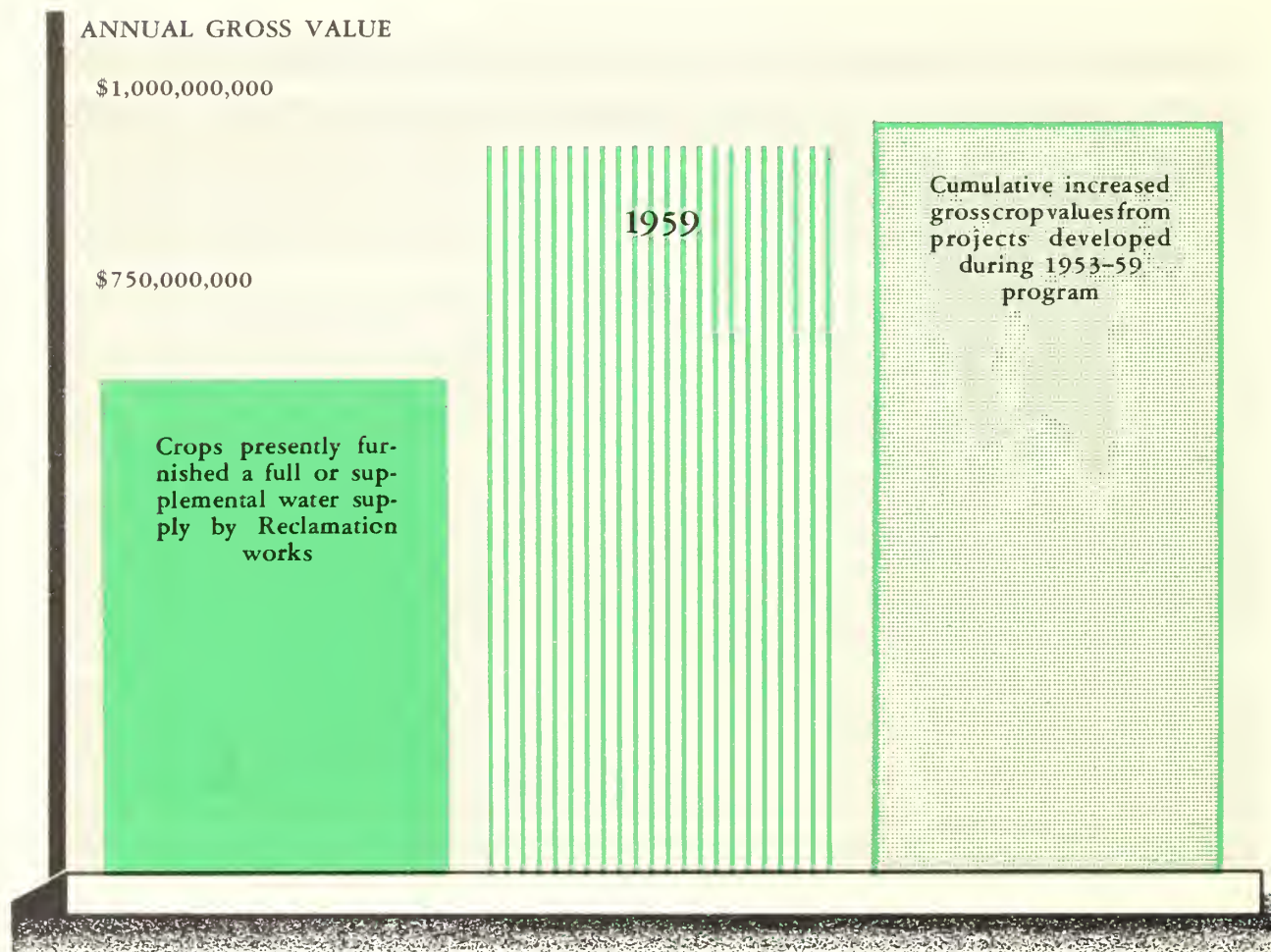
| | <i>Kilowatts</i> |
|-----------|------------------|
| 1955..... | 5,126,427 |
| 1956..... | 5,165,427 |
| 1957..... | 5,719,827 |
| 1958..... | 6,154,727 |
| 1959..... | 7,236,427 |

By regions, the installed capacity on July 1, 1952, and the total capacity on June 30, 1959, including programed additions, would be:

| | <i>Kilowatts</i> |
|---------------|---------------------|
| Region 1..... | 2,027,987 3,544,487 |
| Region 2..... | 454,500 980,000 |
| Region 3..... | 1,609,250 1,797,050 |
| Region 4..... | 6,190 23,990 |
| Region 5..... | 24,300 49,300 |
| Region 6..... | 98,400 481,400 |
| Region 7..... | 149,300 360,200 |

The capacities shown for Region 6 include 85,000 kilowatts in Fort Peck powerplant, constructed and operated by the Corps of Engineers, the power of which is marketed by the Bureau of Reclamation. Capacities of other powerplants being constructed in the Missouri Basin by the Corps of Engineers are not included.

ESTIMATED CROP PRODUCTION



THE ESTIMATED GROSS VALUE of farm crops grown on irrigated land furnished with either a full or supplemental water supply by Bureau of Reclamation works was \$822,000,000 in 1951, at current prices.

In order to set a value on farm crop production resulting from the 1953-59 program, an agricultural price level of 215 (1910-14 equals 100) was applied to this figure and to all estimates of anticipated values during the seven years of the program.

On this agricultural price base the 1952 gross value of crop production would be \$640,000,000. This would increase under the program as follows:

| | |
|-----------|---------------|
| 1953..... | \$660,000,000 |
| 1954..... | 689,000,000 |
| 1955..... | 729,000,000 |
| 1956..... | 761,000,000 |
| 1957..... | 789,000,000 |
| 1958..... | 881,000,000 |
| 1959..... | 925,000,000 |

Cumulatively these annual gross crop values for the seven years of the program would total \$5,434,000,000.

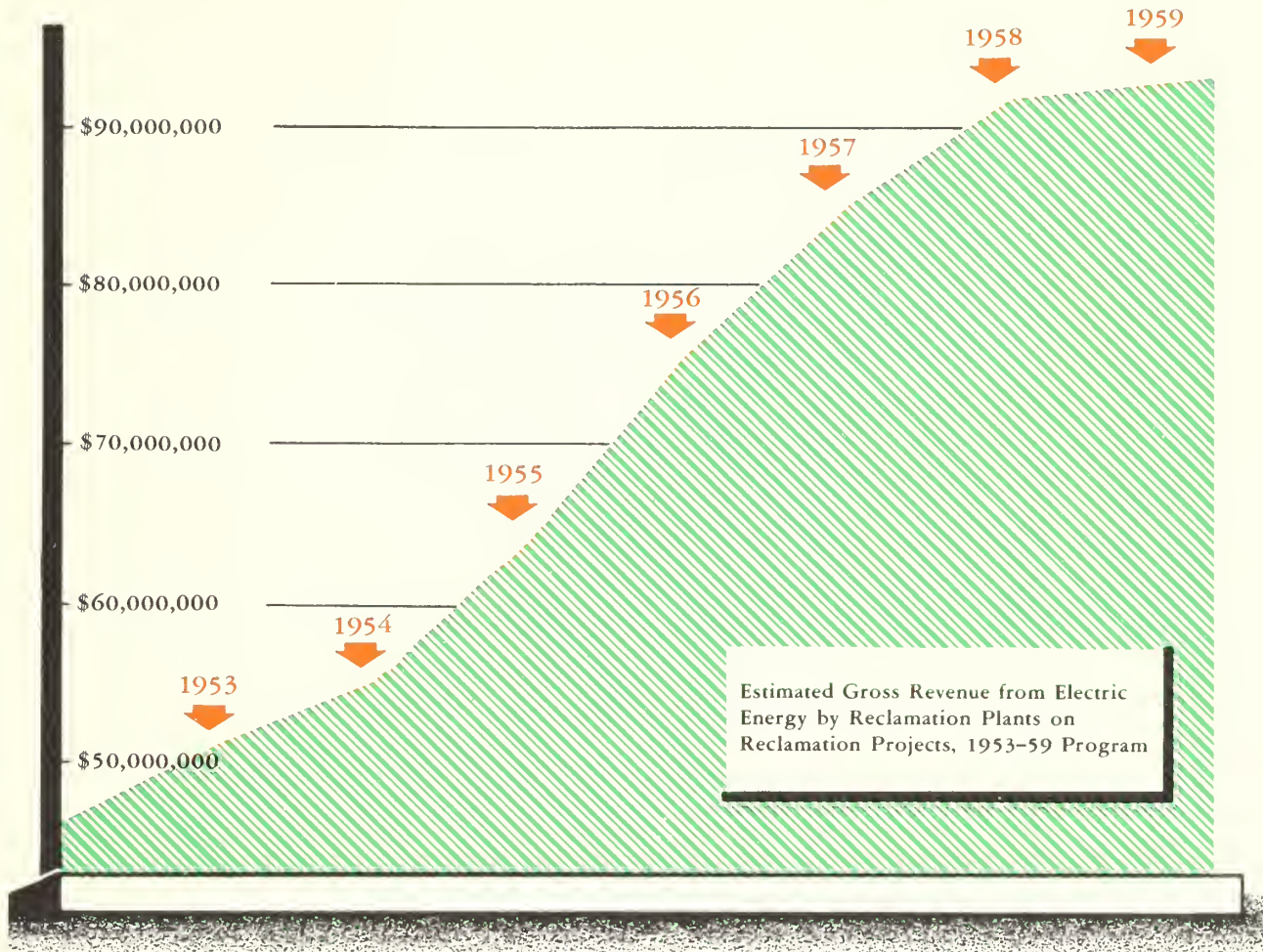
These figures include estimated returns from crops grown on project land already under irrigation as a result of past Reclamation activities in the West, as well as the returns from crops on land that would be irrigated in the future as a result of construction work during the seven-year program. That is, they include the \$640,000,000 base figure for 1952 on an agricultural price level of 215 (1910-14 equals 100).

The cumulative increased annual gross crop values during the seven years of programmed construction would total \$950,000,000. Annual increments over the 1952 gross value would be as follows, in round figures:

| | |
|-----------|--------------|
| 1953..... | \$20,000,000 |
| 1954..... | 48,000,000 |
| 1955..... | 88,000,000 |
| 1956..... | 120,000,000 |
| 1957..... | 149,000,000 |
| 1958..... | 241,000,000 |
| 1959..... | 284,000,000 |

Still larger annual increments would result in succeeding years as the newly irrigated lands reach full development.

ESTIMATED POWER REVENUE



THE GROSS REVENUE from power generated by hydroelectric plants on Reclamation projects during the fiscal year 1952 amounted to \$43,310,035—revenue paid by farmers, homeowners, public and cooperative bodies, and private industry for low-cost electric energy.

Under the 1953-59 program of proposed Reclamation construction of multipurpose irrigation works, this revenue would increase to about \$93,000,000—nearly two times the annual revenue for 1952.

During the 7 years programed, the annual revenue would be as follows:

| | |
|-----------|--------------|
| 1953..... | \$51,000,000 |
| 1954..... | 55,000,000 |
| 1955..... | 64,000,000 |
| 1956..... | 76,000,000 |
| 1957..... | 85,000,000 |
| 1958..... | 92,000,000 |
| 1959..... | 93,000,000 |

Cumulatively, the total gross revenue for the 7 years would reach \$516,000,000, or what may appear to be a sizable immediate return from the power part of the programed multipurpose construction. However, this

sum reflects very inadequately the magnitude of the power receipts that can be expected upon full development of the plans included in the 7-year program. It takes years to build a fair-sized powerplant and many included in the program will have just begun to generate electricity in 1959, the last year of the projected multi-year construction.

Power has been a byproduct of Federal Reclamation development since 1906 when the first 1,000-kilowatt generator was installed in a cave on the Salt River project in Arizona to aid construction of Roosevelt Dam. But exploitation of the power-generating capacity of western streams has barely begun to be judged in the light of potential hydroelectric production.

With full development in future years of the treasure-house of electric energy—the 43,600,000 kilowatt capacity potential—revenues can climb into multiple millions of dollars, repaying many times over the total cost of Reclamation's water development, and at the same time meeting demands of an expanding Western economy with attendant increased agricultural and industrial wealth.

STATISTICAL RÉSUMÉ

Proposed 1953-59 Reclamation Construction Program

(Subject in all aspects to congressional approval. Should not be regarded as scheduled development and conservation of land and water resources in the West, but as a

projection of practical possibilities based on information assembled June 30, 1952, subject to revision.)

[IN THOUSAND DOLLARS]

| Region | Cost to June 30, 1952 | Obligations | | | | | | | | Balance to complete program |
|----------------------------|-----------------------|-------------|----------|----------|----------|----------|----------|----------|-------------|-----------------------------|
| | | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1953-59 | |
| 1 | 702, 742 | 46, 590 | 49, 175 | 43, 314 | 34, 231 | 24, 333 | 13, 162 | 14, 033 | 224, 838 | 209, 838 |
| 2 | 405, 297 | 39, 146 | 53, 956 | 54, 784 | 85, 482 | 68, 102 | 29, 413 | 13, 335 | 344, 218 | 12, 782 |
| 3 | 422, 507 | 21, 480 | 22, 157 | 7, 979 | 7, 142 | 1, 879 | 752 | 254 | 61, 643 | 5, 533 |
| 4 | 74, 527 | 4, 597 | 9, 233 | 16, 262 | 18, 959 | 14, 911 | 10, 901 | 7, 616 | 82, 479 | 13, 125 |
| 5 | 90, 285 | 3, 973 | 2, 748 | 11, 479 | 23, 203 | 39, 772 | 43, 335 | 28, 282 | 152, 792 | 17, 269 |
| 6 | 195, 833 | 44, 576 | 54, 611 | 131, 870 | 152, 857 | 128, 826 | 108, 496 | 87, 651 | 708, 887 | 1, 471, 479 |
| 7 | 266, 995 | 41, 310 | 46, 940 | 68, 984 | 80, 070 | 68, 178 | 68, 497 | 69, 631 | 443, 610 | 880, 246 |
| Alaska | 5, 953 | 13, 019 | 12, 791 | 1, 099 | | | | | 26, 909 | |
| Unallocated ¹ | 4, 144 | | | 350 | 750 | 1, 000 | 1, 000 | 1, 000 | 4, 100 | 2, 900 |
| Subtotal | 2, 168, 283 | 214, 691 | 251, 611 | 336, 121 | 402, 694 | 347, 001 | 275, 556 | 221, 802 | 2, 049, 476 | 2, 613, 172 |
| MRB participating agencies | 30, 327 | 5, 333 | 6, 026 | 10, 000 | 10, 000 | 10, 000 | 10, 000 | 10, 000 | 61, 359 | 208, 313 |
| Total | 2, 198, 610 | 220, 024 | 257, 637 | 346, 121 | 412, 694 | 357, 001 | 285, 556 | 231, 802 | 2, 110, 835 | 2, 821, 485 |

¹ Cost includes physical property not located on projects, and obligations include rehabilitation and betterment work not allocated to projects.

IRRIGATED LAND, FULL AND SUPPLEMENTAL WATER SUPPLY

[IN THOUSAND ACRES]

| Region | Existing June 30, 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1953-59 | Additional future |
|-------------------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|-------------------|
| 1 | 2, 652.8 | 60.1 | 66.0 | 73.0 | 80.8 | 76.6 | 743.7 | 95.1 | 1, 195.3 | 943.8 |
| 2 | 770.9 | 18.3 | 54.6 | 74.5 | 144.6 | 72.1 | 64.3 | 162.2 | 590.6 | 689.5 |
| 3 | 913.0 | 31.3 | 23.8 | 31.3 | 1.5 | 10.0 | 10.0 | 2.0 | 109.9 | 666.5 |
| 4 | 684.5 | 3.3 | 2.4 | 5.4 | 14.1 | 45.2 | 17.0 | 3.5 | 90.9 | 668.1 |
| 5 | 392.9 | | | 7.2 | | | 84.9 | 25.0 | 117.1 | 384.2 |
| 6 | 586.9 | 62.8 | 20.2 | 10.6 | 67.3 | 52.8 | 79.1 | 93.2 | 386.0 | 3, 684.2 |
| 7 | 591.5 | 71.6 | 146.3 | 224.8 | 11.4 | 75.5 | 38.1 | 54.2 | 621.9 | 2, 615.0 |
| Total | 6, 592.5 | 247.4 | 313.3 | 426.8 | 319.7 | 332.2 | 1, 037.1 | 435.2 | 3, 111.7 | 9, 651.3 |
| Cumulative totals | | 6, 839.9 | 7, 153.2 | 7, 580.0 | 7, 899.7 | 8, 231.9 | 9, 269.0 | 9, 704.2 | | 19, 355.5 |

NOTE.—The annual acreage increments for 1953 through 1959 represent land that would be served by Reclamation works as a result of funds invested, as enumerated in table 1. The "Additional future" land would result from the investment of further funds listed under "Balance to complete program" in table 1; it refers to projects comprising the program and does not include any potentially irrigable land which might be served with water as a result of project construction begun after June 30, 1959.

ESTIMATED ANNUAL GROSS CROP VALUES

Based on an agricultural price level of 215 (1910-14 equals 100)

[IN THOUSAND DOLLARS]

| Region | For 1952 | Increment over 1952 | | | | | | | | Additional future annual |
|-------------------|----------|---------------------|----------|----------|----------|----------|----------|----------|----------|--------------------------|
| | | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1953-59 | |
| 1 | 219, 100 | 4, 960 | 10, 410 | 16, 440 | 23, 110 | 29, 450 | 90, 800 | 98, 650 | 273, 820 | 72, 850 |
| 2 | 115, 800 | 2, 750 | 10, 960 | 22, 150 | 43, 890 | 54, 720 | 64, 380 | 88, 740 | 287, 590 | 103, 600 |
| 3 | 145, 800 | 5, 000 | 8, 810 | 13, 810 | 14, 050 | 15, 640 | 17, 230 | 17, 550 | 92, 090 | 106, 300 |
| 4 | 36, 500 | 180 | 310 | 600 | 1, 350 | 3, 760 | 4, 670 | 4, 860 | 15, 730 | 36, 300 |
| 5 | 64, 800 | | | 1, 190 | 1, 190 | 1, 190 | 15, 240 | 19, 360 | 38, 170 | 63, 300 |
| 6 | 16, 400 | 1, 750 | 2, 310 | 2, 610 | 4, 480 | 5, 950 | 8, 150 | 10, 740 | 35, 990 | 102, 500 |
| 7 | 42, 100 | 5, 100 | 15, 520 | 31, 540 | 32, 350 | 37, 720 | 40, 430 | 44, 290 | 206, 950 | 186, 100 |
| Total | 640, 500 | 19, 740 | 48, 320 | 88, 340 | 120, 420 | 148, 430 | 240, 900 | 284, 190 | 950, 340 | 670, 950 |
| Cumulative totals | | 660, 240 | 688, 820 | 728, 840 | 760, 920 | 788, 930 | 881, 400 | 924, 690 | | 2, 261, 790 |

NOTE.—The actual gross crop value on land served from Reclamation works was estimated at \$821,721,665 in 1951.

RECLAMATION PROJECTS

A list of Reclamation projects, divisions or units of projects in the 17 western States as of June 30, 1952, divided into two classes: 1—Projects in operation, under construction, or authorized; 2—Projects, divisions or units of projects

under investigation. The list of projects in operation, under construction or authorized does not include abandoned or discontinued projects and projects not constructed primarily for reclamation.

1—PROJECTS IN OPERATION, UNDER CONSTRUCTION, OR AUTHORIZED

| Project | State | Region | Year authorized | Irrigable acreage ¹ | | Power capacity (K.W.) | | Total cost | |
|--|-------------------|--------|-----------------|--------------------------------|-----------------------|-------------------------|-------------|---------------|--------------------|
| | | | | Crop year 1951 | Ultimate ² | Installed June 30, 1952 | Ultimate | June 30, 1952 | Estimated ultimate |
| Arnold | Oregon | 1 | 1947 | 4, 315 | 9, 755 | None | None | \$205, 535 | \$205, 535 |
| Austin, W. C. | Oklahoma | 5 | 1938 | 47, 810 | 47, 810 | None | None | 12, 262, 330 | 12, 295, 102 |
| Baker | Oregon | 1 | 1931 | 7, 312 | 7, 312 | None | None | 281, 589 | 281, 589 |
| Balmorhea | Texas | 5 | 1944 | 10, 191 | 10, 191 | None | None | 429, 554 | 429, 554 |
| Belle Fourche | South Dakota | 6 | 1904 | 59, 129 | 59, 274 | None | None | 4, 989, 057 | 5, 288, 236 |
| Bitter Root | Montana | 1 | 1930 | 16, 665 | 16, 665 | None | None | 987, 860 | 1, 037, 087 |
| Boise | Idaho-Oregon | 1 | 1905 | 356, 198 | 356, 198 | 36, 500 | 50, 000 | 63, 595, 501 | 66, 054, 707 |
| Boulder Canyon | | | | | | | | | |
| All-American Canal System | Calif.-Ariz. | 3 | 1928 | 577, 715 | 681, 062 | 24, 400 | 34, 000 | 58, 618, 772 | 67, 614, 755 |
| Hoover Dam and Power Plant | Nevada-Ariz. | 3 | 1928 | None | None | 1, 167, 300 | 1, 332, 300 | 165, 921, 027 | 172, 070, 000 |
| Buffalo Rapids | Montana | 6 | 1937 | 22, 524 | 23, 599 | None | None | 4, 474, 127 | 5, 669, 336 |
| Buford-Trenton | North Dakota | 6 | 1939 | 8, 199 | 11, 200 | None | None | 1, 238, 546 | 1, 238, 546 |
| Burnt River | Oregon | 1 | 1935 | 15, 291 | 20, 000 | None | None | 601, 026 | 601, 026 |
| Cachuma | California | 2 | 1948 | None | 29, 650 | None | None | 19, 166, 550 | 36, 967, 000 |
| Canadian River | Texas | 5 | 1950 | None | 20, 000 | None | None | 0 | 82, 731, 000 |
| Carlsbad | New Mexico | 5 | 1905 | 25, 055 | 25, 055 | None | None | 4, 062, 683 | 5, 800, 683 |
| Central Valley | California | 2 | 1935 | 726, 609 | 1, 452, 075 | 454, 000 | 674, 500 | 369, 897, 331 | 737, 158, 287 |
| Colorado-Big Thompson | Colorado | 7 | 1937 | 615, 000 | 707, 710 | 74, 700 | 184, 350 | 123, 518, 759 | 164, 131, 000 |
| Colorado River | Texas | 5 | 1937 | None | None | None | None | 23, 961, 794 | 23, 961, 794 |
| Colorado River Front Work and Levee System | Ariz.-Calif.-Nev. | 3 | 1946 | None | None | None | None | 8, 619, 817 | 12, 190, 000 |
| Columbia Basin | Washington | 1 | 1935 | 6, 915 | 1, 029, 500 | 1, 974, 000 | 1, 974, 000 | 430, 246, 568 | 754, 476, 000 |
| Davis Dam | Ariz.-Nev.-Calif. | 3 | 1941 | None | None | 225, 000 | 225, 000 | 107, 763, 238 | 118, 902, 056 |
| Deschutes | Oregon | 1 | 1937 | 99, 233 | 99, 613 | 1, 500 | 1, 500 | 12, 011, 998 | 12, 943, 000 |
| Eden | Wyoming | 4 | 1940 | None | 20, 000 | None | None | 2, 376, 054 | 6, 152, 000 |
| Eklutna | Alaska | | 1950 | None | None | None | 30, 000 | 5, 952, 526 | 33, 800, 000 |
| Fort Peck ³ | Mont.-N. Dak. | 6 | 1938 | None | None | 85, 000 | 185, 000 | 9, 566, 233 | 25, 400, 000 |
| Fort Sumner | New Mexico | 5 | 1949 | 6, 500 | 6, 500 | None | None | 2, 429, 250 | 2, 430, 250 |
| Frenchtown | Montana | 1 | 1935 | 4, 935 | 4, 935 | None | None | 290, 797 | 290, 797 |
| Fruitgrowers Dam | Colorado | 4 | 1938 | 2, 662 | 2, 662 | None | None | 200, 309 | 200, 309 |
| Gila | Arizona | 3 | 1937 | 29, 148 | 119, 428 | None | None | 26, 200, 271 | 50, 083, 860 |
| Grand Valley | Colorado | 4 | 1912 | 48, 516 | 58, 629 | 3, 000 | 3, 000 | 5, 894, 208 | 5, 956, 936 |
| Grants Pass | Oregon | 1 | 1949 | 10, 350 | 10, 350 | None | None | 100, 000 | 100, 000 |
| Humboldt | Nevada | 4 | 1935 | 40, 012 | 40, 012 | None | None | 1, 214, 321 | 1, 214, 321 |
| Hungry Horse | Montana | 1 | 1944 | None | None | None | 285, 000 | 87, 686, 483 | 102, 900, 000 |
| Huntley | Montana | 6 | 1905 | 32, 508 | 32, 508 | None | None | 1, 552, 159 | 1, 552, 159 |
| Hyrum | Utah | 4 | 1935 | 6, 475 | 8, 975 | None | None | 953, 854 | 953, 854 |
| Intake | Montana | 6 | 1944 | 881 | 881 | None | None | 92, 371 | 92, 371 |
| Kendrick | Wyoming | 7 | 1935 | 14, 482 | 24, 335 | 32, 400 | 68, 400 | 23, 055, 625 | 33, 318, 000 |
| Klamath | Oreg.-Calif. | 2 | 1905 | 172, 655 | 176, 598 | 500 | 500 | 13, 669, 042 | 18, 871, 222 |
| Lewiston Orchards | Idaho | 1 | 1946 | 3, 504 | 3, 838 | None | None | 2, 479, 702 | 2, 488, 000 |
| Lower Yellowstone | Mont.-N. Dak. | 6 | 1904 | 57, 200 | 57, 200 | None | None | 3, 633, 219 | 3, 633, 219 |
| Mancos | Colorado | 4 | 1940 | 8, 592 | 9, 000 | None | None | 3, 863, 767 | 3, 926, 000 |
| Middle Rio Grande | New Mexico | 5 | 1950 | None | 84, 876 | None | None | 840, 684 | 29, 606, 000 |
| Milk River | Montana | 6 | 1903 | 124, 041 | 136, 330 | None | None | 9, 159, 844 | 9, 881, 774 |
| Minidoka | Idaho-Wyoming | 1 | 1904 | 1, 058, 221 | 1, 137, 096 | 13, 400 | 43, 400 | 24, 587, 735 | 43, 706, 054 |
| Mirage Flar | Nebraska | 7 | 1940 | 11, 659 | 11, 659 | None | None | 3, 222, 588 | 3, 282, 588 |
| Missoula Valley | Montana | 1 | 1944 | 977 | 977 | None | None | 278, 762 | 278, 762 |
| Missouri River Basin | Various | 6, 7 | 1944 | 2, 216 | 6, 465, 816 | 37, 200 | 2, 299, 000 | 206, 783, 343 | 3, 701, 535, 683 |
| Moon Lake | Utah | 4 | 1935 | 75, 233 | 75, 233 | None | None | 1, 599, 359 | 1, 599, 359 |
| Newlands | Nevada | 4 | 1903 | 72, 136 | 87, 500 | 1, 640 | 1, 640 | 3, 461, 659 | 3, 461, 659 |
| Newton | Utah | 4 | 1940 | 2, 552 | 2, 552 | None | None | 712, 591 | 712, 591 |
| North Platte | Nebr.-Wyo. | 7 | 1903 | 332, 483 | 333, 560 | 6, 200 | 16, 200 | 20, 959, 332 | 27, 744, 097 |
| Ochoco | Oregon | 1 | 1948 | 8, 500 | 8, 500 | None | None | 848, 830 | 849, 830 |
| Ogden River | Utah | 4 | 1935 | 22, 861 | 22, 861 | None | None | 4, 735, 284 | 4, 735, 284 |
| Okanogan | Washington | 1 | 1905 | 5, 342 | 7, 758 | None | None | 512, 091 | 631, 820 |
| Orland | California | 2 | 1907 | 19, 375 | 20, 784 | None | None | 2, 564, 519 | 2, 564, 519 |
| Owyhee | Oregon-Idaho | 1 | 1926 | 118, 926 | 118, 926 | None | None | 18, 998, 744 | 18, 998, 744 |
| Palisades | Idaho-Wyoming | 1 | 1941 | None | 650, 000 | None | 114, 000 | 3, 638, 964 | 76, 601, 000 |
| Paonia | Colorado | 4 | 1939 | 11, 500 | 11, 500 | None | None | 1, 445, 393 | 6, 723, 308 |
| Parker Dam Power | Ariz.-Calif. | 3 | 1935 | None | None | 120, 000 | 120, 000 | 24, 201, 808 | 24, 201, 808 |

See footnotes at end of table.

1—PROJECTS IN OPERATION, UNDER CONSTRUCTION, OR AUTHORIZED—Con.

| Project | State | Region | Year author- ized | Irrigable acreage ¹ | | Power capacity (KW.) | | Total cost | |
|-------------------|--------------|--------|-------------------------|--------------------------------|-----------------------|-------------------------------|----------|------------------|-----------------------|
| | | | | Crop year 1951 | Ultimate ² | Installed June 30, 1952 | Ultimate | June 30, 1952 | Estimated ultimate |
| Pine River | Colorado | 4 | 1937 | 45,305 | 68,995 | None | None | 3,442,878 | 3,471,437 |
| Preston Bench | Idaho | 4 | 1948 | 6,660 | 6,660 | None | None | 449,554 | 449,554 |
| Provo River | Utah | 4 | 1935 | 46,609 | 56,609 | None | 7,000 | 29,572,570 | 33,463,996 |
| Rapid Valley | South Dakota | 6 | 1939 | 8,900 | 8,900 | None | None | 927,412 | 927,412 |
| Rathdrum Prairie | Idaho | 1 | 1944 | 4,196 | 4,587 | None | None | 482,360 | 482,360 |
| Rio Grande | N. Mex.-Tex. | 5 | 1905 | 175,000 | 198,003 | 24,300 | 24,300 | 25,870,931 | 26,871,825 |
| Riverton | Wyoming | 6 | 1920 | 63,244 | 94,588 | 1,600 | 1,600 | 19,225,126 | 26,626,000 |
| Salt River | Arizona | 3 | 1903 | 334,406 | 334,406 | 70,950 | 70,950 | 22,835,607 | 26,244,689 |
| San Luis Valley | Colorado | 5 | 1940 | None | 556,000 | None | None | 4,736,399 | 56,230,577 |
| Sanpete | Utah | 4 | 1935 | 13,653 | 13,653 | None | None | 374,540 | 374,540 |
| Scofield | Utah | 4 | 1943 | 14,754 | 14,754 | None | None | 943,889 | 943,889 |
| Shoshone | Wyo.-Montana | 6 | 1904 | 98,318 | 111,549 | 10,600 | 10,600 | 20,503,047 | 23,840,598 |
| Solano | California | 2 | 1948 | None | 78,780 | None | None | 0 | 43,420,000 |
| Strawberry Valley | Utah | 4 | 1905 | 44,056 | 44,056 | 1,550 | 1,550 | 3,498,994 | 3,498,994 |
| Sun River | Montana | 6 | 1906 | 97,275 | 98,667 | None | None | 9,924,702 | 10,055,269 |
| Truckee Storage | Nev.-Calif. | 4 | 1935 | 28,793 | 29,976 | None | None | 1,092,423 | 1,092,423 |
| Tucumcari | New Mexico | 5 | 1937 | 42,214 | 42,214 | None | None | 15,107,411 | 15,540,011 |
| Umatilla | Oregon | 1 | 1905 | 32,486 | 32,486 | None | None | 4,411,116 | 4,436,116 |
| Uncompahgre | Colorado | 4 | 1903 | 89,081 | 90,030 | None | None | 5,969,586 | 5,969,586 |
| Vale | Oregon | 1 | 1926 | 32,000 | 32,000 | None | None | 4,962,697 | 4,962,697 |
| Valley Gravity | Texas | 5 | 1941 | None | None | None | None | 0 | 123,052,000 |
| Vermejo | New Mexico | 5 | 1950 | None | 7,200 | None | None | 31,419 | 2,919,000 |
| Weber Basin | Utah | 4 | 1949 | None | 78,000 | None | 5,400 | 0 | 70,385,000 |
| Weber River | Utah | 4 | 1927 | 108,817 | 108,817 | None | None | 2,725,885 | 2,725,885 |
| Yakima | Washington | 1 | 1905 | 453,486 | 474,447 | 2,587 | 24,587 | 45,444,535 | 61,266,949 |
| Yuma: | | | | | | | | | |
| Regular | Ariz.-Calif. | 3 | 1904 | 67,782 | 70,435 | 1,600 | 1,600 | 5,806,743 | 5,806,743 |
| Auxiliary | Arizona | 3 | 1917 | 3,377 | 3,377 | None | None | 2,266,487 | 2,266,487 |

¹ Includes acreage provided or to be provided with a supplementary water supply from Reclamation works, also acreage farmed by special and Warren Act contractors for Reclamation water. Source: 1951 Crop summary and related data.

² On operating projects, includes future extensions of acreage whether authorized or not unless itemized separately in projects, divisions or units of projects listed as under investigation.

³ Power facilities constructed and operated by Corps of Engineers.

2—UNDER INVESTIGATION

The following 269 irrigation possibilities and other Reclamation developments were considered in drawing up the 1953-59 program. Not all projects listed would necessarily be constructed either during the 7-year period of the program or even ultimately, as the investigation of land and water resources in the West is a continuous process governing final determination of the projects to be recommended to Congress for construction. Regional acreage and power totals comprise only projects for which estimates were available as of June 30, 1952. Drainage basin is shown in parentheses.

REGION 1.—81 projects, divisions or units; total estimated acreage 2,841,000, electric power 566,400 kilowatts

Arlington (Columbia), Oreg.
 Baker, Upper division (Columbia), Oreg.
 Baker, Wolf Creek division (Columbia), Oreg.
 Big Lost River, Arco division (Columbia), Idaho.
 Big Wood River (Columbia), Idaho.
 Birch Creek (Columbia), Idaho.
 Bitterroot Valley (Columbia), Mont.
 Blackfoot River (Columbia), Mont.
 Bruneau (Columbia), Idaho.
 Bruneau River (Columbia), Idaho.
 Butter Creek (Columbia), Oreg.
 Camas Creek (Columbia), Idaho.
 Cambridge Bench (Columbia), Idaho.
 Canyonville (Northern Pacific), Oreg.
 Challis (Columbia), Idaho.

Chambers Prairie (Northern Pacific), Wash.
 Cold Springs (Columbia), Oreg.
 Cottage Grove (Columbia), Oreg.
 Council (Columbia), Idaho.
 Cow Creek (Northern Pacific), Oreg.
 Crockett (Columbia), Idaho.
 Crooked River (Columbia), Oreg.
 Dayton (Columbia), Wash.
 Deer Lodge Valley (Columbia), Mont.
 Deschutes, supplemental storage (Columbia), Oreg.
 Eugene (Columbia), Oreg.
 Eureka Flats (Columbia), Wash.
 Flathead River (Columbia), Mont.
 Foster Creek (Columbia), Wash.
 Grande Ronde (Columbia), Oreg.
 Greater Wenatchee (Columbia), Wash.
 Green-Puyallup (Northern Pacific), Wash.
 Hall Creek (Columbia), Wash.
 Harney (Northern Pacific), Oreg.
 Independence (Columbia), Oreg.
 John Day (Columbia), Oreg.
 Jordan Valley (Columbia), Oreg.
 Kalispell (Columbia), Mont.
 Lemhi Valley (Columbia), Idaho.
 Little Lost River (Columbia), Idaho.
 Little Spokane Valley (Columbia), Wash.
 Lolo Creek (Columbia), Mont.

Lower Horse Heaven (Columbia), Wash.
Mann Creek (Columbia), Idaho.
Medicine Lodge (Columbia), Idaho.
Michaud Flats (Columbia), Idaho.
Milton-Freewater (Columbia), Wash.-Oreg.
Minidoka, American Falls Power division (Columbia), Idaho.
Molalla (Columbia), Oreg.
North Bench (Columbia), Idaho.
Pahsimeroi (Columbia), Idaho.
Paulina (Columbia), Oreg.
Pendleton (Columbia), Oreg.
Plains (Columbia), Mont.
Post (Columbia), Oreg.
Raft River (Columbia), Idaho.
Rathdrum Prairie (Columbia), Wash.-Idaho.
Rock Creek (Columbia), Idaho.
Rogue River Basin (Northern Pacific), Oreg.
Salem (Columbia), Oreg.
Sandpoint (Columbia), Wash.
Scio (Columbia), Oreg.
Snake River, Hells Canyon division (Columbia), Idaho-Oreg.
Snake River, Mountain Home division (Columbia), Idaho.
Squaw Creek (Columbia), Oreg.
Stayton (Columbia), Oreg.
Teton Basin (Columbia), Idaho.
The Dalles (Columbia), Oreg.
Tualatin (Columbia), Oreg.
Upper Burnt River (Columbia), Oreg.
Upper Horse Heaven (Columbia), Wash.
Upper John Day (Columbia), Oreg.
Upper Star Valley (Columbia), Oreg.
Vale, Bully Creek extension (Columbia), Oreg.
Walla Walla (Columbia), Wash.
Wapinitia (Columbia), Oreg.
West Long Tom (Columbia), Oreg.
Willamette Flood Plain (Columbia), Oreg.
Willamette Valley Storage Utilization (Columbia), Oreg.
Yakima, supplemental storage (Columbia), Wash.
Yamhill (Columbia), Oreg.

REGION 2.—32 *projects, divisions or units; total estimated acreage 1,276,000, electric power 1,007,500 kilowatts*

Black Butte unit (Central Valley), Calif.
Butte Valley (Central Pacific), Calif.
Clikapudi unit (Central Valley), Calif.
Coloma unit (Central Valley), Calif.
Dinkey Creek unit (Central Valley), Calif.
Folsom Canals unit (Central Valley), Calif.
Fresno-Chowchilla division (Central Valley), Calif.
Friant Power unit (Central Valley), Calif.
Greenville unit (Central Valley), Calif.
Hayfork (Central Pacific), Calif.
Junction Ridge unit (Central Valley), Calif.
Klamath Marsh (Central Pacific), Oreg.
Mendota-Kings unit (Central Valley), Calif.
Nashville unit (Central Valley), Calif.
New Hogan unit (Central Valley), Calif.
New Melones unit (Central Valley), Calif.
Palo Cedro unit (Central Valley), Calif.
Pine Flat Power unit (Central Valley), Calif.
Rollins unit (Central Valley), Calif.
Rubicon unit (Central Valley), Calif.
Sacramento Canals Power unit (Central Valley), Calif.
San Francisco Bay division (Central Valley), Calif.
San Luis division (Central Valley), Calif.
Santa Maria (Southern Pacific), Calif.
Shasta Valley (Central Pacific), Calif.-Oreg.
Sierra Valley unit (Central Valley), Calif.

Sprague River (Central Pacific), Oreg.
Stony Gorge Power unit (Central Valley), Calif.
Swan Lake (Central Pacific), Oreg.
Trinity River division (Central Pacific), Calif.
Union Valley unit (Central Valley), Calif.
Upper San Joaquin River division (Central Valley), Calif.

REGION 3.—17 *projects, divisions or units; total estimated acreage 810,000, electric power 1,130,000 kilowatts*

Bill Williams (Lower Colorado), Ariz.
Bridge Canyon (Lower Colorado), Ariz.
Central Arizona (Lower Colorado), Ariz.
Dixie (Lower Colorado), Utah-Ariz.
Fort Mohave (Lower Colorado), Nev.
Hassayampa (Lower Colorado), Ariz.
Holbrook (Lower Colorado), Ariz.
Las Vegas Pumping (Lower Colorado), Nev.
Marble Canyon (Lower Colorado), Ariz.
Moapa Valley (Lower Colorado), Nev.
Palo Verde Mesa (Lower Colorado), Calif.
Pilot Knob Mesa unit (Lower Colorado), Calif.
Santa Margarita (Southern Pacific), Calif.
Snowflake (Lower Colorado), Ariz.
Victor (Lahontan), Calif.
West Mesa unit (Lower Colorado), Calif.
Winslow (Lower Colorado), Ariz.

REGION 4.—39 *projects, divisions or units; total estimated acreage 2,181,500, electric power 213,400 kilowatts*

Animas-La Plata (Upper Colorado), Colo.-N. Mex.
Bear River (Bonneville), Idaho-Utah
Central Utah (Bonneville), Utah-Colo.
Cliffs-Divide (Upper Colorado), Colo.
Collbran (Upper Colorado), Colo.
Colorado River Storage (Upper Colorado), Ariz.-Colo.-N. Mex.-Utah-Wyo.
Deer Creek Power Plant (Bonneville), Utah.
Dolores (Upper Colorado), Colo.-Utah.
Dulce (Upper Colorado), Colo.-N. Mex.
Emerald Lake (Upper Colorado), Colo.-N. Mex.
Emery County (Upper Colorado), Colo.
Florida (Upper Colorado), Colo.-N. Mex.
Fruitgrowers Dam project extension (Upper Colorado), Colo.
Gooseberry (Upper Colorado), Utah.
Gunnison River (Upper Colorado), Colo.
Hammond (Upper Colorado), N. Mex.
Humboldt extension (Lahontan), Nev.
LaBarge (Upper Colorado), Wyo.
Lyman (Upper Colorado), Wyo.
McElmo (Upper Colorado), Colo.
Nucla (Upper Colorado), Colo.
Pack Creek (Upper Colorado), Utah.
Paradox (Upper Colorado), Colo.
Pine River extension (Upper Colorado), Colo.-N. Mex.
San Miguel (Upper Colorado), Colo.
Saucer Valley (Upper Colorado), Colo.
Seedskadee (Upper Colorado), Wyo.
Silt (Upper Colorado), Colo.
Smith Fork (Upper Colorado), Colo.
South San Juan (Upper Colorado), N. Mex.
Sterling (Bonneville), Utah.
Sublette, Buckskin division (Upper Colorado), Wyo.
Sublette, Fontenelle Dam and Reservoir (Upper Colorado), Wyo.
Walker River (Lahontan), Nev.-Calif.
Washoe (Lahontan), Calif.-Nev.
Weber Basin (Bonneville), Utah.
White River (Upper Colorado), Colo.-Utah.
Yampa River (Upper Colorado), Colo.-Wyo.
Yampa River, Savery-Pot Hook unit (Upper Colorado), Colo.-Wyo.

REGION 5.—96 projects, divisions or units; total estimated acreage 960,000, electric power 840,000 kilowatts

Ada (Arkansas), Okla.
Alva (Arkansas), Okla.
Arthur City (Red), Okla.-Tex.
Balmorhea (Rio Grande), Tex.
Belzoni (Red), Okla.
Big Creek (Gulf), Tex.
Black Mesa (Arkansas), N. Mex.
Bluewater (Rio Grande), N. Mex.
Broken Bow (Red), Okla.
Brownwood (Gulf), Tex.
Bueyeros (Ute Creek) (Arkansas), N. Mex.
Caddo Creek (Red), Okla.
Canadian River (Arkansas), Tex.
Caney (Red), Okla.
Canton (Arkansas), Okla.
Caprock (Red), Okla.
Castaneda (Arkansas), Okla.
Cimarron Valley (Arkansas), N. Mex.
Chapel Hill (Red), Ark.
Chickasha (Red), Okla.
Chickaskia (Arkansas), Kans.
Concan (Gulf), Tex.
Cotulla (Gulf), Tex.
Duncan (Red), Okla.
Durwood (Red), Okla.
Eagle Pass (Rio Grande), Tex.
Englewood (Arkansas), Okla.-Kans.
Fort Cobb (Red), Okla.
Fort Gibson (Arkansas), Okla.
Fort Griffin (Gulf), Tex.
Foss (Red), Okla.
Fowlerton (Gulf), Tex.
Gaines Creek (Arkansas), Okla.
Gainesville (Red), Okla.-Tex.
Garretts Bluff (Red), Okla.-Tex.
Gillham (Red), Ark.
Gracemont (Red), Okla.
Guthrie (Arkansas), Okla.
Hennepin (Red), Okla.
Jim Ned (Gulf), Tex.
Junction (Gulf), Tex.
Kemp (Red), Okla.-Tex.
Keystone (Arkansas), Okla.
Kiowa (Arkansas), Okla.
La Pryor (Gulf), Tex.
Lovell (Arkansas), Okla.
Lower Nueces River (Gulf), Tex.
Lukfata (Red), Okla.
Mangum (Red), Okla.
Menard (Gulf), Tex.
Meridian (Gulf), Tex.
McKnight (Red), Okla.
Miami (Arkansas), N. Mex.

Mimbres Closed Basin (Rio Grande), N. Mex.
Minco (Arkansas), Okla.
Mora (Arkansas), N. Mex.
Mountain Park (Red), Okla.
Mountain View (Red), Okla.
Neosho (Arkansas), Okla.-Kans.
Norman (Arkansas), Okla.
Nueces River Power (Gulf), Tex.
Ocate (Arkansas), N. Mex.
Oklahoma City (Arkansas), Okla.
Palo Duro (Arkansas), Tex.-Okla.
Parsons (Arkansas), Kans.
Pauls Valley (Purdy) (Red), Okla.
Pine (Red), Okla.
Presidio (Rio Grande), Tex.
Pryor-Choteau (Arkansas), Okla.
Purcell (Arkansas), Okla.
Quihi (Gulf), Tex.
Quitaque (Red), Tex.
Red Bluff (Rio Grande), Tex.
Rio Grande, Caballo Power Plant (Rio Grande), N. Mex.-Tex.
Robert Lee (Gulf), Tex.
Sabinal (Gulf), Tex.
San Angelo (Gulf), Tex.
San Juan-Chama (Rio Grande), Colo.-N. Mex.
San Saba (Gulf), Tex.
Seymour (Gulf), Tex.
Shidler (Arkansas), Okla.
Silverdale (Arkansas), Kans.
Smithville (Narrows) (Red), Okla.
Stigler (Arkansas), Okla.
Tucumcari Water Supply (Arkansas), N. Mex.
Tularosa Closed Basin (Rio Grande), N. Mex.
Tuskahoma (Red), Okla.
Upper Dierks (Red), Ark.
Valliant (Red), Okla.-Tex.
Vermejo, Ultimate (Arkansas), N. Mex.
Wade (Red), Okla.-Tex.
Waurika (Red), Okla.
Webbers Falls (Arkansas), Okla.
West Texas (Red), Tex.
Wichita (Arkansas), Kans.
Zapata (Rio Grande), Tex.

REGION 6.—*In addition to investigations of phase C units of the Missouri River Basin project (see under 1—Under Construction or Authorized for Construction), investigations are under way in this region leading to the development of further areas in the Missouri River Basin*

REGION 7.—4 projects; total estimated acreage 914,000, electric power 836,000 kilowatts

Blue-South Platte (Upper Colorado), Colo.
Fryingpan-Arkansas (Upper Colorado-Arkansas), Colo.
Gunnison-Arkansas (Upper Colorado-Arkansas), Colo.
South Pass (Upper Colorado), Wyo.

